

The Analysts Journal

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Published by

THE NATIONAL FEDERATION OF FINANCIAL ANALYSTS SOCIETIES



There are more ways than one to be a leader

AS OUR NAME clearly indicates, we are in the telephone business.

We own and operate 1,696 central offices in 30 states.

We manufacture telephones, switches, relays and other communications equipment, for our own use—and for the 4,400 other "independent" telephone companies in the United States.

And while—by the yardstick of size—we cannot claim to be the leader, we find ample opportunity for leadership in other ways.

Take the telephone pictured here as an example. It is our own design.

At first glance, it may look quite a bit like other modern telephones.

But you will find three important differences.

The surfaces just above the dial on each side are contoured to guide the mouthpiece-receiver or "handset" into place unerringly.

An extra quarter of an inch is added to the tapered mouthpiece and earpiece.

And the cradle which receives the "handset" is lower in front than in the rear.

The result: It is almost impossible for an "off-the-hook" interruption to service to happen.

This is, as we said, one example of how we seek to do whatever we do better than it has been done before.

And this same ambition guides every phase of our operation, from the development of better equipment for telephone central offices, to the courtesy-training of the people who represent us in dealing with our customers.

General Telephone Corporation
260 Madison Avenue, New York

GENERAL TELEPHONE



One of the World's Great Communications Systems

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Finding the new and improved in Plastics, Chemicals and Textiles is a continuing Celanese program. Celanese Corporation of America, 180 Madison Avenue, New York 16, N. Y.

Celanese® Fortiflex®

Glidden doubles own

and more are planned...for

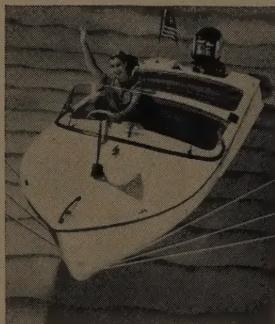


Glidden Drive-In Paint Center at Lubbock, Texas, includes ample parking area, a retail outlet, sales service offices and warehousing facilities to give best service to Glidden dealers and paint contractors in the Lubbock area.

Glidden helps industries sell by improving paint products and developing new ones



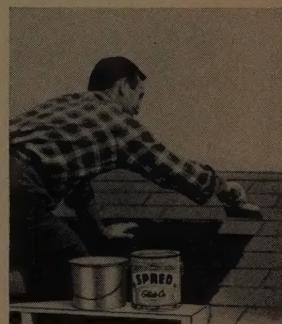
A resin finish that's tough, but smooth—even on old boxcars like this! Sets up a chemical-resistant moisture barrier on metal, masonry or wood . . . a Glidden maintenance product that's practically damage-proof!



Boat you never need to paint—Its hull is molded plastic. Glidden Paint research discovered the polyester resin now widely used in making many molded plastics—from boats to washing machine tubs and furniture.



Famous Spred Satin, the original latex wonder wall paint, goes on twice as fast and easy as ordinary paints, dries in 20 minutes without brush marks, is so washable you won't have to paint again till you want to change colors!



Now—color-style the whole house. Spred Glide-On is a vinyl-latex emulsion paint which will not fade, flake or peel. For all masonry, stucco. Used on roofs, light colors reflect sun's heat, cut temperatures under the roof.

Drive-in Paint Centers

better, more profitable distribution

As Glidden moves rapidly in the direction of controlled paint distribution through its own wholesale-retail branches, 52% of its consumer paint sales are now direct to dealers. Direct distribution is helping Glidden lower costs, add a substantial number of independent retailers, and serve them better.

Further expansion of factory-owned branches is planned. Several are under construction. Sizable expenditures have been made also to increase productive capacity at Glidden paint plants in Atlanta, Cleveland and Reading, Pennsylvania.

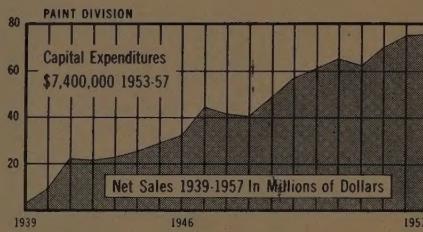
These expenditures were necessary to keep pace with Glidden U. S. sales increases of 155% since 1945 compared to an industry average of 121%. In the same period, Glidden paint profits increased 145%. Current capital investments are being made to assure a continuation of that profit growth rate.



THE GLIDDEN COMPANY

900 UNION COMMERCE BLDG., CLEVELAND 14, OHIO

Growing with the horizons of chemistry



Glidden leadership in marketing and technical development continues to set the pace for the paint industry. To maintain and strengthen this leadership, the Glidden Paint Division, during the past 5 years, has invested \$7.4 million in both new and modernized facilities.

THE STRUCTURE OF GLIDDEN DIVERSIFICATION MEANS GROWTH

Diversification is not new to The Glidden Company. Glidden was founded on the premise that planned diversification offers maximum opportunity for profit.

Management recognized that diversification of products, markets and facilities opened the widest door to growth. Diverse fields of operation were entered. Products within each operation were expanded through research and alertness to future needs. Markets widened. Plant facilities were increased every-

where. This was also the period of integration of these seemingly unrelated operations.

Now, this structure of integrated diversification has been established. Glidden has attained its maturity, a position of stability demonstrated by its earnings. Each Glidden Division is a profitable, growing business, supplying other Glidden Divisions as well as selling to a wide variety of other industries, as indicated below.

CHEMICALS-PIGMENTS-METALS

Pigments and Metal Powders
for Industry
Paint
Paper
Plastics
Rubber
Appliance
Ceramics
Building Materials
Transportation
Marine
Leather
Glidden Paint Division

SOUTHERN CHEMICAL

Naval Stores
Terpene Chemicals; Resins
Rubber
Plastics
Chemical
Cosmetics
Food
Building Materials
Essential Oil
Paint
Textile
Pharmaceutical
Soap and Detergent
Glidden Paint Division

PAINT

For Consumers; Product Finishes
Industrial Maintenance
All Surfaces
Consumer Paint Market
Painter Trade
Container
Industrial Maintenance
Automotive
Appliance
Construction
Building Materials
Furniture
Transportation
Boat and Marine
Electronics
Plastics

CHEMURGY

Soybean Derivatives
Grain Merchandising
Food
Pharmaceutical
Paint
Packaging
Building Materials
Transportation
Rubber
Plastics
Graphic Arts
Paper
Glidden Paint Division
Durkee Famous Foods

DURKEE FAMOUS FOODS

For Food Processors
Restaurants; Consumers
Consumer Food Market
Baking
Confectionery
Institutional Cooking
Restaurant Trade
Specialty Food

©1957

Elevator loads freight into one rocket, while another makes radio-controlled parachute landing. Soon, giant unmanned missiles may carry freight to Europe and South America—in minutes. Thompson Products has the experience and skill to help design and build important components for such radical new spacecraft.

Want to build a freight rocket?



Thompson Products can help you handle the job

One of these days, a future-minded manufacturer may launch a rocket freight service, and reap a sky-full of profits.

This company could well turn to Thompson Products for aid in designing and building components for these huge, freight-carrying missiles. Ever since the earliest days of flight, Thompson has displayed remarkable ingenuity in developing advanced new aviation products.

Today, Thompson supplies precision-made parts not only for piston-powered planes, but for all American jets. And Thompson scientists, designers and engineers have now turned their talents to guided missiles.

Thompson has blazed new trails not only in the sky, but on the ground (for the automotive business), in the ground (for agriculture), and even *under* the ground (for mining)—not to mention dozens of other industries.

If you're considering the development of an advanced new product, why not call the Thompson people and let them help you get it on the assembly line?

You can count on

Thompson
Products

From Thompson's 21 research centers and factories in 18 cities, come, each year, important new advances in mechanics, electronics, hydraulics, pneumatics, aerodynamics, thermodynamics and nucleonics.

as a partner in solving the design and production problems of an advancing technology

General Offices, Cleveland 17, Ohio

The Analysts Journal

FEBRUARY
1958

The Eleventh Annual Convention of
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Hotel Statler, Los Angeles, California

May 18 to 22

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The Most Enticing Growth Location

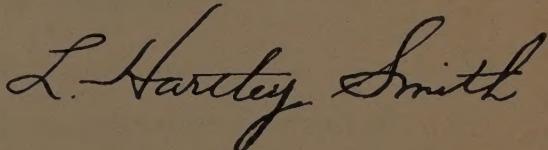
BECAUSE of the great beauty of Los Angeles travellers have long been attracted to this portion of California. Today another attribute is luring visitors and bringing distinction to the area. A vast increase in industrial activity places Los Angeles in a leading position both businesswise and financially, and has made the West Coast an important manufacturing section.

Here, with its rapidly expanding population and diversification of projects, each with financial importance, outlets are provided for sound investments. Los Angeles may well be considered the most enticing "growth location" in America. Electronic establishments doing in excess of one billion dollars of business annually, steel works, aircraft and automobile builders, rubber, chemicals, foods, stone and clay producers have been added to the early petroleum and entertainment industries. Together they have been the foundation and the flowering of a most remarkable development.

With all this production came the need for financial institutions. They have been one of the prides of the city. Through notable banks and brokerage houses—guided by financial analysts—came funds, investors, and new ideas for further business creative effort.

Los Angeles, always enterprising and hospitable, has arranged most unusual and interesting visits and inspection trips, as well as forums, for guests to the May Convention. So enlightening will some of these trips be that members and their friends are certain of returning to their homes both wiser and happier.

We look forward to having all interested financial experts as our guests.



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SPECIAL TRAIN TRIP



Through the Southwest to the Los Angeles Convention and Home via the Northwest

Cars on a special train scheduled to leave Chicago on May 13 will permit analysts to see places of interest and visit some of America's most important manufacturing plants. They will be able to base their estimates of industries on personal observations and investigations. This is a rare opportunity.

Cities and corporations of the Southwest are to be covered during the first part of the trip. Then Los Angeles and the Eleventh Annual Convention; after which the travellers will see San Francisco, followed by the Northwest. The train is planned to return to Chicago on May 30.

Very few spaces still remain available on the special train. Persons desiring to take advantage of so good an opportunity should contact Robert Caird, Burlington Lines, 1033 Grant Ave., Kansas City, Mo.

After completing this enlightening tour it is certain that participants shall augment their understanding of what makes value, and be permanently enriched by the results of a first hand examination of investment possibilities.

*Eleventh Annual Convention
of the
National Federation of Financial Analysts Societies*

Hotel Statler, Los Angeles, California

May 18-19-20-21-22

Members and Interested Persons Are Cordially Invited

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to This Issue

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What is the Bell System?

The Bell System is wires and cables and laboratories and manufacturing plants and local operating companies and millions of telephones in every part of the country.

The Bell System is people . . . hundreds of thousands of employees and more than a million and a half men and women who have invested their savings in the business.

It is more than that. **The Bell System is an idea.**

It is an idea that starts with the policy of providing the best possible telephone service at the lowest possible price.

But desire is not enough. Bright dreams and high hopes need to be brought to earth and made to work.

You could have all the equipment and still not have the service you know today.

You could have all the separate parts of the Bell System and not have the benefits of all those parts fitted together in a nationwide whole.



The thing that makes it work so well in your behalf is the way the Bell System is set up to do the job.

No matter whether it is some simple matter of everyday operation—or the great skills necessary to invent the Transistor or develop underseas telephone cables to distant countries—the Bell System has the experience and organization to get it done.

And an attitude and spirit of service that our customers have come to know as a most important part of the Bell System idea.

Bell Telephone System

What About the Next Ten Years?

WILLIAM T. FARICY

TEEN YEARS AGO, THE RAILROADS had only recently completed the truly epic rail transportation performance of World War II—a performance of which it has been said that nowhere in all the world was the military might of America lessened, or the striking power of its armed forces diminished, by reason of any failure of rail transportation here at home.

We took pride in the past, but we were more concerned with what lay ahead in the future. Ten years of what was then the future are now in the past. These years have seen the virtual completion of the diesel revolution in railroad motive power, then only in its early stages. They have seen the spread of centralized traffic control, the introduction of automatic "push button" freight yards, the wide adoption of the principle and practice of transporting trucks and trailers on flat cars.

In the decade just past the railroads have spent more than \$8 billion for over 22 thousand new locomotive units and for 638 thousand new freight cars. In the same years the railroads have spent more than \$3½ billion for improvements in fixed plant—for better tracks and bridges, yards and terminals, signals and shops, and a host of other new and improved elements in the roadway and structures which are at the foundation of the railroad business. The railroads have, in sum, spent in the past ten years just under \$12 billion, an average expenditure of almost \$1.2 billion a year, to help build the better railroads which are necessary to meet our country's needs in transportation.

INTENSIFIED RESEARCH

At the same time they have stepped up their programs of research. Ten years ago the Association of American Railroads had no research laboratory. Today the AAR's railroad research center on the campus of the Illinois Institute of Technology in Chicago includes three modern and well-equipped buildings, all completely devoted to railroad research. Steps are under way looking to the exercise of the Association's option on a site for still a fourth, and doubtless there will be yet other buildings with their scientific apparatus for the conduct of still more penetrating studies and research of an ever-broadening range. This advancement in railroad research has not gone unnoticed. On October 16, 1957, in Philadelphia, the Association of American Railroads was awarded the Franklin Institute's much coveted Henderson Medal, as the citation says, "In recognition of the many achievements of the Mechanical and Engineering Divisions in the many fields of railway engineering." The citation goes on to say that the research efforts of the AAR have resulted in more dependable equipment and tremendous savings in the operation of railroads, all of which are reflected in greater safety and reduced transportation charges for the American public.

That there will be great changes in the physical plant and equipment of railroads as a result of broader research is a

certainty. Even though there may be no single change yet on the horizon so dramatic as the diesel revolution in motive power, there will be a host of less conspicuous developments in plant and equipment which, in total, will have a profound effect upon the art and practice of railroading.

Speaking of these improvements and the important contributions they make to more efficient and more economical railroad service, the Honorable Owen Clarke, Chairman of the Interstate Commerce Commission, said in an address on November 19, 1957:

It seems to me that most of the more spectacular gadgets we hear proposed from time to time have a way of passing like autumn leaves, while the real innovations which cause our industry to grow come up unnoticed from nearer the roots of the transportation tree.

For example, I doubt whether our space-minded public is yet fully aware of the miracles in rail service which have been wrought in the past few years, or which are presently in the making, by such relatively unspectacular things as dieselization of motor power, centralized traffic control, electronic freight classification yards and mechanical track laying machines. The average man may not be interested in scientific hot-box detection, roller bearing wheels, or welded rails, but in one way or another he is sure to feel the effects that these and similar things have on his pocketbook, his personal comfort, and his business advantage. People may like to talk and dream about the super-gadgets; but I'd wager we'll be watching Sputniks from domed railway cars for a long time before the first one of us takes a rocket ride to Chicago or a space trip to the moon.

The reason for this is obvious. Innovation, improvements, revolutionary developments in industrial services grow not from scientific day-dreams nor government sponsored experiments. Rather, they grow out of public and private needs. . . . Transportation of tomorrow is going to grow out of the needs and necessities of today.

Equally important changes are in prospect in the methods of performing transportation service, if the railroads are relieved of some of the limitations which now make it difficult to offer to the public a complete service by using the various means of carriage best suited to each portion of the movement.

And it may be anticipated also that rate-making rules will be so relaxed in the future as to make it possible for each form of transportation to give the public the full benefit of its inherent advantages, whatever they may be in any particular instance.

In most cases, the advantage of the railroads is in cost, as is indicated by the fact that they haul a ton of freight one mile for an average revenue of less than 1½ cents as compared with an average ton-mile revenue of 6 cents for haulage by common carrier motor trucks reporting to the Interstate Commerce Commission. This four-to-one difference in average revenue does not mean that rail rates are that much less than truck rates on the average, but it does give some indication of the difference in the level of costs of moving

goods in trains of cars on tracks and moving them in separate unit vehicles, each with its own driver.

I am confident that the next ten years will see, either through administrative determination or legislative clarification, elasticity in the making of rates, provided always that no rate shall be put in which is non-compensatory, or which discriminates against or prefers any shipper, any commodity, any community or any region.

In the next ten years I believe that we shall see better through scheduling of freight service, with less time spent in intermediate yards and with necessary classifications performed, for the most part, in major electronic classification yards.

I believe also that we shall see an improved freight car supply—improved not only in total number of cars but in average quality and in greater adaptability to special purpose shipments. Two years ago, in the last quarter of 1955, I suggested that to overcome the then deficit in freight car ownership would require installation of an average of at least 75,000 new cars in each of the next five years. In the first two years of that period, this goal of 75,000 cars per year has been achieved, resulting in a net increase of 50,000 in total ownership of cars, over and above retirements. If, and this is a big if, the railroads are able to find the money to continue to order and build cars on this scale—75,000 new ones each year—as well as to keep on making the improvements in roadway and structures which are so essential to getting the fullest use out of the freight cars, the next few years will see elimination of the car shortages which have plagued us in time of brisk business ever since the end of World War II. But everything depends on earnings. And so I come back to this vital question.

ADEQUATE EARNINGS ESSENTIAL

The triple keys to the future of railroads as a business are earnings, investment, improvement. And the first of these is earnings—for without earnings, or the prospect of earnings, investment languishes. Without continued investment there can be no great improvement in capacity or service. And so we come to the very heart of the future of railroads as a business—the improvement of earnings.

Ten years ago the railroads employed 1,350,000 men, who worked an average of 2,672 hours for a total of \$4,350 million in wages. In 1956, the railroads hauled substantially the same volume of freight traffic with only 1,042,000 men, a reduction of over 22 per cent. These men worked an average of 2,365 hours each, a reduction of 11.5 per cent. But the total payroll had gone up to \$5,325 million, an increase of 22.5 per cent. And along with this increase in payroll had gone comparable increases in the prices of materials and supplies—the next largest item in the cost of operating a railroad.

But, fortunately for the railroads and the shippers alike, the same ten years which saw these increases in the major items of railway operating costs, saw the investment of nearly \$1,200 million a year in improvement projects which have paid off handsomely in better service and reduced costs. Indeed, I doubt very much that the railroads could have withstood the lapping tides of inflation without the improved facilities which this capital investment provided.

This rate of investment must be continued and, if the money can be found, should be stepped up, both on account of the increasing needs of the railroads and the effect of inflation upon the cost of making improvements.

IMPROVEMENT FUNDS SCARCE AND COSTLY

What are the prospects for financing such a continuing program? Depreciation and retirement charges will not do the job since we are replacing cars which cost \$2,500 each, and have been depreciated on that basis, with cars which cost \$8,500 apiece. Two years ago some funds could be realized from an increase in the amount of equipment obligations outstanding. Some can still be raised that way, but it is becoming increasingly difficult and increasingly expensive. Two years ago a modest part of the sums required could still be procured by increased withdrawals from working capital. Not any more. Working capital is now down to where it must be conserved in the cases of all but a few of the most prosperous railroads. With everything counted, more than one-third of the amount needed to finance continued improvements, even at the level of the past ten years, will have to be squeezed out of the net income of the railroads.

This net income, in turn, comes out of what is left from the total return on capital after the payment of necessary fixed charges. In no one of the past ten years, in which for the most part good times have prevailed in the country, has the return on net investment in railroads reached 4½ per cent; in five years it has been below 4 per cent; in one year it dropped under 3 per cent.

By prudent financial management the railroads have succeeded in reducing their fixed charges by more than \$50 million a year in 1956, as compared with 1947, but even with this substantial assist, they face grave problems in financing the improvements in plant and equipment which must be made.

But lest I sound pessimistic (which I am not) let me ask a question: When have the railroads not faced problems?

Problems are nothing new in the life of American railroads. The railroads were born of the problem of finding some way to provide cheap and dependable all-year transportation for the interior of this vast and richly productive continent, whose resources then lay fallow for lack of such outlets.

The men who built these railroads were men of faith and vision, of resourcefulness and determination. And they had need of all these qualities of strength to carry out the tasks they had set for themselves of pushing out those thin lines, first of iron and then of steel, which made possible the free flow and interchange of products upon which the economy of this great nation is built.

ONLY TRAINS CAN DO JOBS SO WELL

With the coming of other forms of transportation, there is a disposition on the part of the uninformed to feel that the day of railroads may be drawing to a close. Nothing could be farther from the truth, as you can see by looking, with a discerning eye, at the next freight train you see going by. A freight train is such a familiar sight that most of us are likely to fail to see what a remarkable vehicle it really

is—a vehicle made up of as many as a hundred, or more, separate units, loaded at different origins, consigned to different destinations, all assembled for mass movement with maximum economy in the use of manpower, in the consumption of fuel, and in money cost.

The average freight train—counting way freights and movements which are, in effect, traveling switch engines, as well as the mile-long through freights—the average freight train carries 1,400 tons of lading. To move the same tonnage by motor vehicle, at average loadings, would require 140 trucks and at least that many drivers, as against the freight train crew, usually, of five men.

There are transportation tasks in which other collateral and incidental factors cause the motor truck to be preferred, but when it comes to the basic elements of cost in moving the vast bulk of America's commerce, there is nothing in existence, and nothing in sight, which can take the place of the train of cars on tracks.

WHERE IMPROVEMENT IS NEEDED

There is room for improvement in the services rendered by these trains. There are engineering problems to be solved in the design of equipment which will be better adapted to shipper needs without at the same time becoming so narrowly specialized as to increase unduly the return movement of those same cars empty.

There are operating problems to be solved, in order that we may get the most and the best service out of the improved equipment which the designers have in store for us.

There are rate problems, looking toward a more realistic adjustment of rates to the requirements of commerce as well as the cost characteristics and the revenue necessities of the carriers.

But underlying all these problems, if the railroads are to go ahead and continue to meet the needs of the nation as they should, is the problem of the sub-standard earnings which handicap the railroads in their endeavors to move ahead and to continue to meet the needs of the nation.

The problem is one of costs swollen by inflation and not

fully covered by rate increases. It is a problem of rate adjustments disturbed by the necessity for seeking general horizontal increases if the railroads were to remain solvent. It is a problem of rate rigidity, due to the complications and difficulties in making prompt adjustments to meet changing situations.

It is a problem of taxation—a problem which is not exclusive to the railroads, by any means, but one to which they are peculiarly susceptible by reason of the fact that they own and maintain their basic transportation facilities and not merely the vehicles which operate over them.

And it is a problem of competition, some of which is directly subsidized and most of which has the use, either free or at non-compensatory charges, of expensive facilities provided and maintained by the public treasury.

The solutions to the problems which I have touched upon will depend upon the resourcefulness and the determination of the railroad men who, now and in the future, must face them in the first instance. But railroads are a wholly regulated industry, and as such they are at the mercy of legislative and regulatory bodies to provide and administer the sound regulatory policy that is essential to their continued improvement and growth. They must be relieved of the Federal excise taxes of 3 per cent on freight and 10 per cent on passengers which are encouraging the trend toward private transportation, as distinguished from transportation for hire. They must be permitted to assert their principal and inherent advantage of low cost, as other carriers are now permitted to assert fully their advantages of service. They must have tax equality with other forms of transportation. Finally, they must be freed of regulations which now limit their ability to serve the public through use of other modes of transportation. Then the railroads would really be able to provide a complete, coordinated transportation service.

Freed of these artificial restrictions on their ability to compete and to serve the public, the railroads will grow and prosper with the country, and will continue to exemplify the private enterprise system which is the foundation of our country's greatness.

* * *

"We have now the anomaly of an easy money market and hard times. From month to month, since 1881, commodities have fallen in price, wages have been cut down, manufactures closed, workmen thrown out of employment. . . . There have not been for years a greater scarcity of trade bills, so little demand for the deposits that banks and discount houses hold. . . . The price of iron has steadily fallen through the year 1883."

Benner's Prophecies, by Samuel Benner, 1884

"What then is the relation between the course of railway earnings and of the securities dependent upon them for returns? The answer may, of course, confidently follow that the security fluctuations regularly antedate the course of earnings. This is as it should be."

William Z. Ripley



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Solar Energy—Its Domestic and Foreign Implications

JOHN I. YELLOTT

FOR NEARLY A DECADE after the victorious conclusion of World War II, we in the United States assumed that, since we possessed the world's greatest productive capacity, we were also the world's leaders in all aspects of science. On October 4, 1957, our complacency was rudely shattered by the appearance in our skies of a sphere, a cone, and a cylinder. The sphere was the Russian satellite, 1957 Alpha, and the cone and cylinder were debris from the vehicle which hoisted this ingenious petard into its orbit. Far from being a mere "iron ball" tossed casually into outer space by an over-enthusiastic skyrocket, Sputnik was a Fourth of October announcement that the future has crowded in upon the present, and far sooner than most of us expected.

Today we find ourselves engaged in a race for scientific supremacy, a race in which we and the Soviets will seek astounding accomplishments as much for the purpose of influencing men's minds as for gaining military predominance. We must without fail overcome the lead which Russia's rocket experts have gained in the field of penetrating outer space, but we must pay even more attention to the vastly more important problem of raising the standard of living of the billions of people on *this* planet who "have never read a book, known a doctor, or seen an electric light bulb."¹

The United States is the only nation which, at the beginning of its history, possessed large and readily accessible supplies of the three fossil fuels—coal, petroleum, and natural gas. Liberal use of those fuels has enabled us to achieve the world's highest standard of living, but in so doing we have also developed the world's greatest appetite for energy. Today, with only 7 per cent of the world's population, and 8 per cent of its land area, we are using 40 per cent of the earth's total annual energy production. Even more important is the fact that two-thirds of our annual demand is for the fluid fuels, which constitute less than 2 per cent of our total fossil fuel reserves.

THE DEVELOPMENT OF THE UNITED STATES

The future development of the United States will depend largely upon our ability to make good use of all of our energy resources, nuclear and solar as well as fossil. So prodigious will be the world's demands for energy that, before the end of this century, we and the other temperate zone nations will have to call on our only inexhaustible resource, solar radiation, to perform many of the services for which we now use fossil fuels. There will simply not be enough of them to go around!

I. Energy Inventory, 1957 and 1975

a. How Fast Are We Using Our Fossil Fuels?

A study of the United States energy requirements for

1. See footnotes at end of article.

1900 and 1957 gives a basis for estimating what is likely to happen in 1975. Even the most accomplished crystal-ball gazer hesitates to look much farther ahead than that! In 1900, electricity and the automobile were just being introduced to the 76 million inhabitants of the United States, who were then using energy at the relatively moderate per capita rate of 1290 Therms[†] per year. The total American energy demand for 1900 was less than 100 billion Therms, and 90 per cent of that was supplied by coal and wood. Comfort heat accounted for 60 per cent of the total, work of various kinds required 30 per cent, and process heat constituted the remaining 10 per cent.

In the past 57 years our population has grown to 170 million, and, thanks to the automobile and the electric light, our per capita energy consumption has risen to 2500 Therms per year. Our total energy requirement this year will exceed 430 billion Therms, of which two-thirds will be supplied by the fluid fuels, oil and gas. For the world as a whole, the total energy requirement for 1957 will be about 1,000 billion Therms, even though the per capita consumption of the 2.6 billion people who live outside of the United States will be less than 400 Therms. Coal, wood, farm waste and animal dung will supply most of this demand. Prime Minister Nehru was recently quoted as saying that 75 per cent of the energy used by India's 600 million people today is produced from cattle dung!

By 1975, the population of the United States will be close to 230 million and our per capita energy demand will rise to 3,300 Therms per year, giving a total demand of 750 billion Therms.² If today's trend towards the fluid fuels were to continue uninterrupted, 90 per cent of this would come from oil and gas³ but this will not take place because of the increasing cost differentials between coal and the fluid fuels. Growth in electric generation will account for much of the increase in total energy demand, and this will have to be provided largely by coal-burning and atomic power plants.

ENERGY USE IN OTHER NATIONS

Throughout the rest of the world, a rapidly growing population will outnumber us by at least 16 to 1. The per capita energy use in other nations will increase just as rapidly as their finances will permit, and their great demand will be for oil. The United States made its transition from an agricultural to an industrial economy by using the great supplies of high-grade coal which lay conveniently near the Eastern seaboard, but this possibility does not exist for the other nations of the world. They will want oil, and they will make every effort to get it from the great reservoirs of the Middle East.

†The Therm, 100,000 British thermal units, is widely used in the gas industry and elsewhere for expressing amounts of energy.

b. How Much Remains in our Energy Bank Account?

When we attempt to evaluate our reserves of fossil and nuclear fuels, we come up against several hard facts.^{2, 3, 4} First, there is agreement only on the fact that the potential energy in our known uranium deposits is more than twice as great as in our known and anticipated stores of fossil fuels. Since there are many uses where the perilous radiation of uranium isotopes cannot be exchanged for the carbon and hydrogen safely stored in the fossil fuels, it is by no means adequate to perform a simple division of annual use into total reserves in order to determine probable years of life for these reserves.

Second, there is much divergence of opinion about the extent of the fluid fuel resources which are yet to be discovered. Authoritative estimates for domestic and world petroleum reserves have recently been published by L. G. Weeks, chief geologist for Standard Oil of New Jersey⁴ who concludes that a conservative estimate of total recoverable United States petroleum is 240 billion barrels; his figure for the entire world including the Middle East is 1,500 billion barrels. Translated to heat units (at 52 Therms per barrel), these become 1,250 and 7,800 billion Therms respectively. Cumulative United States production since Drake's well was drilled a hundred-odd years ago is 55 billion barrels; 1957 production is about 3.2 billion barrels.

Similar data for natural gas reserves were published last summer by L. F. Terry and J. G. Winger of the Chase Manhattan Bank.⁸ They conclude that the total recoverable supply in the United States will exceed 1,200 billion MCF (thousand cubic feet), or about 1200 billion Therms. Terry and Winger also presented a graph of probable withdrawal rates, showing that the maximum annual rate of about 20 billion MCF (200 b.Th.) would be reached between 1980 and 1990.

The best solid fuel data available are those of the United States Bureau of Mines Geological Survey Circular 293, of October 1, 1953,⁵ which estimates that our total recoverable coal is close to 420 billion tons, or 110,000 billion Therms. If we cut this tremendous figure in half to eliminate seams which are too thin, too deep, or too inaccessible to mine for less than twice today's cost, we still have 55,000 billion Therms.

The reserves of atomic fuels, primarily uranium, are still extremely speculative, but even the lowest estimates put this asset in our energy bank at more than twice the total of the fossil fuels. We must remember that, thus far, we can only use the heat from nuclear fission in relatively primitive and high-cost steam plants, and the principal use which we now foresee for the atom is in marine propulsion and the generation of electricity. Other uses will come, but they are not yet in sight.

c. How Long Will Our Fossil Fuels Last?

The magnitude of our fossil fuel reserve is the subject for vigorous disagreement among equally competent authorities. They all agree that the demand for fuels is growing at a rate between 2 and 3 per cent per year, which means that it will double before the end of this century, and double again before the middle of the next century. However large actual

reserves of recoverable fuel may be, the middle of the 21st century will find them largely depleted. This is a matter of simple arithmetic and compound interest. If we sum up the total consumption year by year, allowing for a 2 per cent growth, we will find that our recoverable reserves will have been reduced to virtually zero at some date between 2025 and 2075 A.D. If our present estimate of 70,000 billion Therms is correct, the earlier date will prevail, whereas if our estimate of total reserves is low by a factor of 3 to 1, and we actually have 210,000 billion Therms, we will push the inevitable ahead by about 50 years.

Unless there are radical changes in our fuel use pattern, before the end of this century we, our children, and our grandchildren will have used most of our readily accessible conventional energy resources. Changes there will surely be, caused by rising fuel prices, but they will only postpone and not prevent the inevitable exhaustion of our low-cost energy supplies.

Atomic energy will, for some uses, gradually replace fossil fuels as they rise in cost. Electricity from fission and perhaps fusion power plants will have to supply many of the needs for which we now use coal, oil, and gas. Solar energy will have to supply much of the low temperature heat which we now use for space heating and similar purposes.

II. Solar Energy

a. Photosynthesis

In a broad sense, all of the energy which we use today, with the possible exception of the atomic energy now being used in a handful of applications, comes from the sun. Our fossil fuels are vanishing relics of the sunshine of ages past. In the future, we can look towards solar radiation as an inexhaustible source of energy income, and we must find ways by which we can use it at reasonable cost.

Nature uses solar energy on a prodigious scale. Heat from the sun evaporates the sea water which falls again as rain or snow, and it sets in motion the air masses which constitute our winds. Of paramount importance is the constantly recurring miracle of photosynthesis which, in eras so ancient that geologists can only guess at their actual dates, created the plants which became our fossil fuels.

Today, the same process of combining carbon dioxide from the air with water and sunlight from the skies produces all of the food which we eat and the oxygen which we breathe. We understand some of the fundamentals of this complex process, but we are not able to create any device which brings it about more efficiently than the plants which nature has already created. We know, for example, that our familiar plants, such as corn, wheat, and rice, could grow at least four times more rapidly if the air around them contained more carbon dioxide. We know also that primitive single-celled organisms called algae can use sunlight much more efficiently than the higher plants, but the cost of the equipment, and particularly the carbon dioxide needed to nourish these substances, is higher than the price of conventional grains. In the future, we look forward to greatly improved photosynthetic processes, but these must wait upon fundamental work now going forward in many laboratories.

b. Photochemistry

Another familiar way of making use of solar radiation is through chemical processes. The most familiar of these is in the field of photography, where light can cause changes to take place in sensitized films. Originally, we could process such films to the point where we could distinguish between black and white, or light and shade. Now, the process has been refined to the point where we can detect, record, and reproduce all the colors of the rainbow.

Processes have been discovered by which light can, to a very limited extent, decompose water into hydrogen and oxygen. This gives rise to the hope that fuels of the future might conceivably come from sea water. This, however, is also far in the future, because the yields of present processes are far too small to make them commercially interesting. However, at the Massachusetts Institute of Technology and Stanford Research Institute, work is underway on the photolytic decomposition of water, and positive results have been obtained already. If hydrogen and oxygen can be produced in sufficient quantities, we can, with the aid of the inexhaustible carbon supplies in our limestone deposits, eventually produce all of the hydro-carbons which we need.

c. Photoelectric Processes

More than 100 years ago, a French chemist discovered that light, falling upon an electrolytic cell, could cause a current to flow. The efficiency of the process was almost as low as the recovery of hydrogen from the photochemical process mentioned above. Within another few years, other chemists and physicists found that solid substances could also be made to generate electricity when they were properly illuminated. Here the efficiency was considerably better, and a whole industry has grown up around photoelectric devices using the element selenium. The maximum efficiency of these devices was still low, but it was high enough to allow them to be used for photographic exposure materials, control devices, etc. Indeed, a few lights were lit, motors run, and radios operated by selenium solar cells, but the outlook for substantial power generation from the sun was still dark.

THE SILICON SOLAR CELL

Three years ago, a team of scientists at the Bell Laboratories, seeking to produce improved transistors, found that highly purified silicon, suitably treated, was an excellent material for producing electricity from solar energy. The silicon cell constituted a major "break-through" because, in one step, the efficiency of converting light into electricity was raised by a factor of 10.

The silicon solar cell is now at work in many applications. Each cell must still be made from a thin slice of a single crystal, and this limits its output, but a battery of 100 cells can produce enough energy to power remote radio transmitters, telephone lines, or neon lights on a mountain-top beacon. A very important application which would have been a source of amusement, or even derision, a year ago is the supplying of electrical power to radio transmitters in satellites. Since the silicon cell has no moving parts, and there is nothing which can wear out, we have every reason to believe that they will continue to operate indefinitely.

This means that a satellite or space vehicle can, within the limitations of the area which it can expose to the sun, continue to transmit information just as long as the other components of its radio system will endure.

The development of the silicon solar cell ranks as a triumph for basic research, and there is good reason to believe that other research groups will succeed in developing a large-area- solar-electric device which can produce much greater quantities of electricity at lower costs. At the present time, the economics of the situation do not permit solar electricity to compete with power generated in central stations, or even from small fuel-burning engines. The cost of solar power is comparable to that obtained from flashlight cells, and the uses will be similar. The explorer who is lost in a dark cave does not stop to think that the power in his flashlight is costing him hundreds of dollars per kilowatt hour, and the cost of getting a satellite into the sky is so prodigious that no one is concerned about the fact that the power used by its radio transmitters is equally expensive. The time will come, however, when photoelectric devices will be sufficiently low in cost so that isolated houses can obtain useful quantities of electricity from the sunlight falling on their roofs.

III. Heat from the Sun

The application of solar energy which is practical in every sense of the word today is the generation of heat. By the use of proper equipment, we can produce temperatures ranging from sub-zero to at least 5,000° F through the use of solar radiation. To operate refrigeration equipment we must resort to one of the processes such as absorption refrigeration, already in use in many conventional applications. To produce temperatures up to 200° F, we can use simple flat devices, which trap the rays of the sun. To go to higher temperatures, we must concentrate a large area of sunshine on a relatively small spot, as we do with a burning glass or a concave mirror. Since these applications are potentially of great importance, they will be discussed in more detail.

a. Solar Refrigeration

At the present time, we know how to produce refrigeration by at least three processes. The conventional mechanical refrigerator, such as is used in millions of homes, could be operated by sun-powered engines, but, at the present time, this does not appear to be too encouraging. The absorption refrigerator, familiar to many in the form of gas-fired refrigerators or steam-operated air conditioners, can also be activated by solar heat. This has already been successfully demonstrated in the Russian Solar Laboratory at Tashkent and the French Research Center at Mont Louis in the Pyrenees. Intermittent refrigeration has been accomplished at the University of Wisconsin, and some success has been obtained in continuous refrigeration at the University of Florida. All of these devices operate from the same general principle. A concave parabolic trough is used to concentrate the sun's rays upon a device which generates steam or heats a refrigerant absorber. The steam can be used to drive ammonia or Freon out of solution, after which it can be condensed and then expanded through refrigerating coils. This process is already used on a very large scale

in many applications where waste steam is available. It appears to have considerable promise for use with solar heat collectors which are also suitable for providing winter space heating.

Another type of solar refrigeration which has been pioneered in Russia uses a jet ejector to evaporate refrigerant from a container, thereby lowering its temperature. The vapor which operates the jet is obtained from a solar heat collector. This system has not yet been tested in the United States, but a research program is now being planned to try out this idea at the University of New Mexico.

Refrigeration by solar energy is potentially of the greatest importance, because many of the more densely populated sections of the world lie in tropical regions where there is plenty of solar energy, and a great need for refrigeration, but no electricity or fuel by which that refrigeration can be accomplished with conventional equipment. Also, solar heating in the United States would be much more feasible from an economic point of view if the same collection apparatus could be used for summer cooling.

SOLAR STILLS

b. Distillation of Sea Water

Solar stills for producing fresh water from salt have been used in various parts of the world for almost 100 years. Complete evaporation of salt water ponds has been used since ancient times to produce salt. Only recently, however, has man learned to capture and condense the evaporated water, to give him potable supplies in regions where only salt or brackish water exists.

In 1878, a very large solar still was erected in Chile, to supply drinking water to the pack mules at a copper mine in the Andes. During World War II, survival kits were provided to virtually every naval aviator, by which he could produce enough water each day to keep him alive, using only salt water and sunshine.

The principle of these solar stills is simple. Sunlight passing through a transparent cover, is allowed to heat a thin layer of water held in a blackened container. Some of the water evaporates, and the vapor condenses on the underside of the transparent cover. This cover serves many purposes, the most important of which is to trap the heat of the sun, by allowing the sunlight to pass into the still, but preventing the low temperature heat from escaping. Glass has been the conventional material for covering solar stills, but, within the past two years, several transparent plastic films have emerged from the industrial laboratories, which can do an excellent job.

Du Pont's laboratories have produced several weatherable plastic materials which have optical properties similar to those of glass, but which are so strong that they can be used in thicknesses no greater than 3 to 5 thousandths of an inch. These are so light that they can be supported by air alone, and do not need elaborate structures. Experimental stills using such films have given encouraging results, and it is reasonable to expect that they can be built at costs low enough to produce drinking water. Since irrigation water must be still cheaper by a factor of almost 10 to 1, we are not yet in a position to produce water for this purpose by solar distillation, but drinking water is well within the

realm of possibility, and its cost is considerably below that being paid in particular localities such as Key West, Florida, where fresh water must be imported through an 80-mile pipeline.

c. Cooking, Steam Generation, etc.

The sunlight which reaches the earth is relatively diffuse, and it does not exceed about 300 heat units (Btu) per sq ft per hour. In order to reach temperatures high enough to cook food or to generate high pressure steam, solar radiation must be concentrated. Simple flat mirrors can be used to reflect sunlight from a large area on to a relatively small target, or to heat a cavity such as an oven. Successful ovens of this type have been designed by Dr. Maria Telkes of New York University, working under a grant from the Ford Foundation. They are of real importance in those areas of the world where fuel is scarce and hence very expensive. In the lands surrounding the Mediterranean, for example, wood is virtually the only fuel which is within reach of the working population, since petroleum products and coal must be imported at high cost. Wood, in turn, means physical labor on the part of the housewife, because it is usually her responsibility, particularly in country villages, to make a long trek into the hills to bring back fallen branches and twigs. Solar stoves which can make this virtually unnecessary for even a part of the time will be very welcome, provided that they can be produced at a low enough cost.

Where really high temperatures are needed, a parabolic mirror can be used. Here the rays of the sun are reflected by a moving mirror to a fixed concentrator. This again reflects the rays to its focal point, and here a miniature image of the sun is created. If the mirrors are accurate and highly polished, temperatures as high as 5,000° F can be produced at the focal point of the solar furnaces. Such devices are now being used in many industrial and governmental laboratories for studying the properties of materials and the reactions which proceed at very high temperatures. The largest such furnace in the world at the present time is located at the French Laboratory in Mont Louis, and still larger ones are planned by both the French and the United States Air Force. These will be used primarily for research at very high temperatures and, in the case of the French, for processing materials which cannot be produced in conventional furnaces.

IV. Space Heating by Solar Energy

The most important application of solar energy at the present time is in the field of space heating. Approximately 30 per cent of all of the energy which we consume in the United States is used for this purpose, and, regardless of how the fuel is burned, the end product is usually a stream of air or a wall surface heated to a temperature not far above 100° F. This same result can be accomplished by a very simple solar device. This device is the flat-plate collector, and many versions have been designed and tested during the past 50 years.

The essential parts are a transparent cover, a blackened sheet of metal with tubes attached, and an insulated back. The transparent cover allows the energy of the sun to pass

and fall upon the blackened metal sheet. The sheet is heated, and it in turn gives off radiation, but these long heat waves cannot pass through the glass. The insulation on the back of the heated collector plate prevents the wasting of the collected heat. The tubes attached to the plate contain the water which carries away the heat. Fifty to 60 sq ft of collector surface similar to this will supply the average single family in the latitudes of Florida, California, and the Southwest with their domestic hot water needs. More surface is needed in higher latitudes, but the same principle can be followed. Water temperatures as high as 140° can be obtained during periods of bright sunshine, and, if a large and well-insulated storage tank is used, most of the domestic hot water requirements can be supplied from the sun.

It must be recognized that some auxiliary source of energy has to be available in order to insure enough hot water at all times, because even the largest storage tank would be emptied after several days of bad weather. However, between 50 and 90 per cent of the domestic hot water requirements can be provided by solar energy throughout most of the United States. Whether it is worthwhile to make the investment for a solar collector depends upon the local cost of fuel. In Florida, where fuel costs have always been relatively high, solar water heaters have been popular. In the urban areas of Arizona, where cheap natural gas is available, solar water heaters have not been widely used. For other sections of the world, where fuel costs range up to five times those experienced in the United States, solar water heaters made from locally available materials appear to be a very acceptable solution to the problem of supplying domestic hot water.

Space heating by solar energy has been accomplished by a number of systems. A refinement of the simple flat-plate collector is an example. Here a sheet of transparent plastic is used as the glazing material, and aluminized paper is used as the reflective insulation behind the tube-in-strip collector plate. By mounting collectors such as this on the south-facing portion of the roof of an average house, or on a vertical area such as a south-facing wall or fence, enough solar energy can be collected to do a significant part of the heating job in the spring and fall and, in many parts of the country, during the winter as well.

Two systems have been used with varying degrees of success. The first uses water as the fluid for collecting and transferring the heat. Energy storage is provided by a large buried tank. Supplementary heat, to take care of periods of bad weather, can be supplied either by a fuel-burning heater, or by a heat pump, which can also be used for summer air conditioning. This system has been in successful use at the Solar Building in Albuquerque, which was designed and built by the consulting engineering firm of Bridgers & Paxton. A similar system is in use in the experimental residence recently completed at the Massachusetts Institute of Technology. The Association for Applied Solar Energy is now building a home on the desert near Phoenix which will also use a heated water system, with a large storage tank and a heat pump. This residence is the result of a worldwide architectural competition which was conducted during the summer of 1957 by the Association and which was won by

Peter H. Lee, an undergraduate at the University of Minnesota.

The solar collecting area in the Phoenix house is the louvers which are located over the south patio, the central court and the north patio. These do double duty, since they serve as heat collectors in the winter, and as shading devices in the summer. Enough collector area has been provided to heat the house, supply the domestic hot water requirements, and to warm the swimming pool. The house is expected to be completed by March 1, 1958, after which it will be used as a living laboratory to study solar heating, and, ultimately, solar cooling as it applies to the arid sunny Southwest.

An equally effective means of solar space heating uses air as the heat collecting and transfer medium, and a bed of rocks or concrete blocks to store the heat. Chemicals which pick up heat as they freeze and give it off again as they melt can also be used with either the air or the water-operated system. A residence was recently completed in Denver by Dr. George Lof, consulting engineer, which uses collecting elements, as air heaters and two large cylinders, located in the center of the house, to contain the heat-storing gravel bed. A heat pump will supply the necessary auxiliary heat in winter and will cool the house in summer.

FEASIBLE SOLAR HEATING DEVICES

To summarize the solar heating situation, there are many feasible devices which can be used for this purpose, and the major problem is one of reducing the cost of the heat collection and storage elements to the point where the fixed charges are less than the fuel costs for conventional equipment. At the present time, the fixed charges must be assessed against the heating operation only, but, in the foreseeable future, the heat which can be collected in the summer, at least 2 or 3 times larger than the winter collection, can be used to operate air conditioning devices. When this is accomplished, the fixed charges are immediately distributed over the entire year, instead of only the heating season. Solar space heating, in conjunction with the heat pump, appears to be a particularly desirable combination, because the heat pump thrives on a situation where its heat source is at a relatively high temperature. When the heat pump has to take its heat from a 0° F outside air source, and deliver it at 100° within the house, the power output is usually excessive. When the heat pump can take sun-heated water at 80° and boost its temperature to 100°, the power cost is obviously much lower. Where summer cooling is also essential, as it is throughout the entire Southwest, the carrying charges on the heat pump can thus be spread over the entire year, giving a much more economic set-up than where a refrigerator is used for summer operating and a fuel burning device is used for winter comfort. In the foreseeable future, when the price of natural gas will rise so high that it cannot economically be used for space heating, the combination of the heat pump and the solar collector will be extremely important.

V. Conclusion

Solar radiation is now being re-examined by a number of companies whose managements are aware of the full significance of the energy situation. Producers of both glass and

weatherable plastics, such as American Window Glass, Libbey-Owens-Ford, Pittsburgh Plate Glass, and Du Pont, are participating in solar energy development to an extent commensurate with their own interest in the subject. The weatherable plastics are potent competitors of glass in this field, because of their lower first cost, and the ease with which they can be applied.

Solar collectors now in use are made of metal, and companies such as Revere Copper and Brass, with their tube-in-strip, and Reynolds Metals and Olin Mathieson, with their versions of the tube-in-sheet process, are looking carefully at the solar collector business. Aluminum is likely to play a very important part in the future of solar collectors, because of its high thermal conductivity, and its attractive feature of more square foot of surface per dollar of cost. The first costs of solar collectors must be kept to an absolute minimum, and here we find applications for some of the new plastic materials as insulators, covers, supports, and piping.

All solar devices require pumps, fans, and controls, and, in this latter field, the Minneapolis Honeywell Company has been active and effective. In the field of solar electricity, manufacturing rights to the Bell Silicon cell have been granted to several companies. International Rectifier Company has long been a major factor in the photocell business, and Hoffman Electronics has done outstanding work in

adapting the silicon cell to use with radios, highway flashers, and similar devices.

WHAT WILL THE OUTCOME BE?

Solar energy may be compared to Rip Van Winkle, who had a vigorous childhood, and then slept for many, many years. The story does not tell us where he went after he awoke. Solar energy was studied vigorously nearly a century ago by many intelligent men, of whom John Ericson was the leader in the United States. It is once again being considered and this time for reasons which are far more compelling in the long run. Only time will tell what the outcome will be, but one thing is sure—we must learn how to use the endless energy which comes to us from the sun.

FOOTNOTES

1. Dedier, Stevan; "Research and Freedom in Underdeveloped Countries." Bulletin of the Atomic Scientists, Sept. 1957, p. 238.
2. Skrotzki, B. J.; "Energy—a Special Report." Power, Sept. 1957, p. C-39 to C-46.
3. Terry, L. F. and Winger, J. G.; "Sees 1,200 Trillion Cubic Feet U. S. Recoverable Gas." American Gas Association Monthly, July-August, 1957, p. 10.
4. Weeks, L. G.; "We Are Not Running Out of Fuel." Chemical Processing, Oct. 1957, p. 28 ff.
5. Yellott, J. I.; "Energy for Tomorrow." Power Engineering, Dec. 1956, p. 98.

Newport News Shipbuilding and Dry Dock Company

Quarterly Statement of Billings, Estimated Unbilled Balance

of Major Contracts and Number of Employees

(Subject to audit adjustments)

Billings during the period:	Three Fiscal Months Ended			Year Ended
	Dec. 31, 1957	Dec. 31, 1956	Dec. 31, 1957	Dec. 31, 1956
Shipbuilding contracts	\$25,182,494	\$27,693,958	\$ 97,178,365	\$ 81,747,157
Ship conversions and repairs	7,620,979	10,578,822	35,921,292	24,885,560
Hydraulic turbines and accessories . . .	1,251,776	430,604	2,845,294	2,888,359
Other work and operations	5,251,649	2,448,859	18,632,980	10,048,116
Totals	\$39,306,898	\$41,152,243	\$154,577,931	\$119,569,192

Estimated balance of major contracts unbilled at the close of the period

At December 31, 1957

\$449,639,228

At December 31, 1956

\$371,735,676

Equivalent number of employees, on a 40-hour basis, working during the last full work-week of the period

12,452

12,020

The Company reports income from long-term shipbuilding contracts on the percentage-of-completion basis; such income for any period will therefore vary from the billings on the contracts. Contract billings and estimated unbilled balances are subject to possible adjustments resulting from statutory and contractual provisions.

By Order of the Board of Directors
R. I. FLETCHER, Financial Vice President

January 22, 1958



GUARDING 5 BILLION FLIGHT MILES

"On final approach," radios the pilot. Down goes the landing gear for another happy landing. Special petroleum lubricants and fuels — pioneered by Texaco research — play an important part in the 5 billion passenger miles flown each year. *During the past 22 years more scheduled revenue airline miles in the United States have been flown with Texaco Aircraft Engine Oil than with all other brands combined.* A typical example of how Texaco research cooperates with industry.

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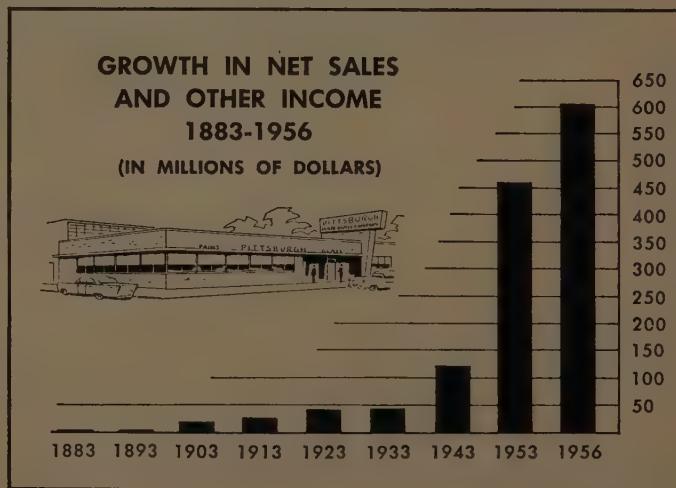
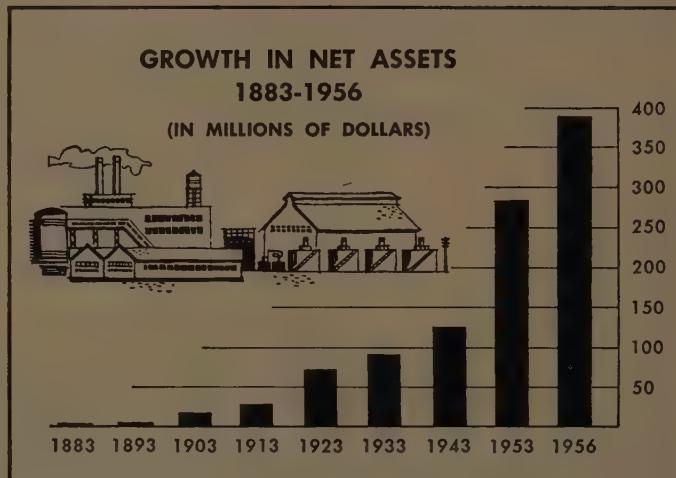
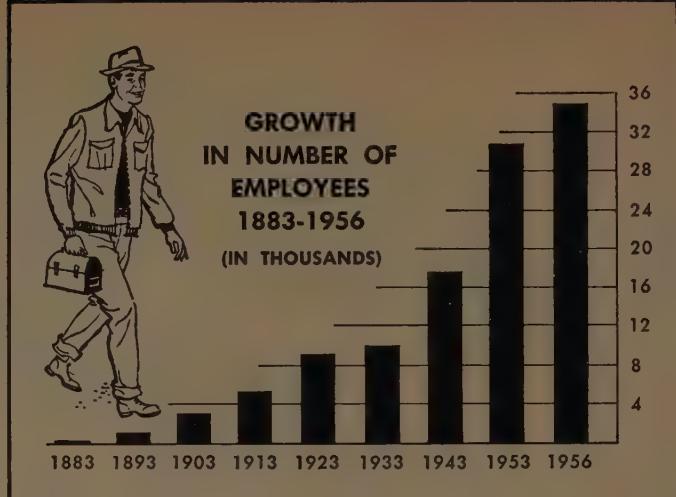
“Pittsburgh Plate” at the 75th milestone

The year 1958 marks the 75th anniversary of the Pittsburgh Plate Glass Company—a company whose name has been the symbol of quality and service to four generations of Americans.

“Pittsburgh Plate” was organized in 1883 and began to operate America’s first commercially successful plate glass plant at Creighton, Pa. To strengthen its position and to promote the use of plate glass, the Company in 1896 set up its own merchandising system. This was the beginning of the Company’s policy of dynamic diversification. Today, as the Company reaches its 75th year, it operates 40 glass, paint, chemical, fiber glass and other plants and maintains over 300 sales offices and merchandising units.

Seventy-five years of steady progress is eloquent testimony to the wise administration of the Company’s diversification policy. For customers it provides expanding lines of new and improved products, for employees new and better jobs, and for shareholders a fair return on their investment. The Company’s progress is due not only to the men whose sound judgment has charted the course but also to all those faithful and efficient employees who, through the years, have contributed to the Company’s progress and have enjoyed its benefits.

The enviable reputation of Pittsburgh Plate Glass Company for business integrity, for fair dealing with customers and employees, for progressive research and development and for faithful performance of its obligations provides a firm foundation for the Company’s progress in the years ahead.



SYMBOL OF SERVICE FOR SEVENTY-FIVE YEARS

PITTSBURGH PLATE GLASS COMPANY

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Forecasting and the Diffusion Indexes

ALBERT T. SOMMERS

HERE HAS BEEN A RAPID GROWTH of interest in the forecasting possibilities of diffusion measures, and some of the research results yielded by the study of the cycle have been transferred from structural analysis to "leading indicator" analysis, and thence to diffusion forecasting.

There are problems encountered in the course of this transfer, for some statistical procedures, enlightening with respect to the past, seem often to be inscrutable with respect to the future.¹ Yet this approach is convenient and useful. Mechanical devices such as diffusion indexes are more open to critical analysis than other forecasting procedures because they are explicit. One need hardly add that no forecasting device can eliminate all the uncertainty attaching to the future of business conditions, and the presence of uncertainties in diffusion measures is hardly a criticism.

A fundamental difference in emphasis exists between diffusion studied for its structural implications and diffusion in its forecasting uses. The National Bureau's structural studies of the cycle demonstrate that changes in the degree of diffusion of expansion and contraction in business conditions are correlated with the direction of movement of the system as a whole. The business cycles defined and explored by the Bureau are owing to (and can be measured by) the gradual swing from consensus to diversity to new consensus among a large number of statistical series whose individual identities, however important they may be in a causal study of the cycle, are not essential to the correlation. On the other hand, the forecasting uses of diffusion analysis depend upon a controlled, or ordered, disagreement, among selected series. Diffusion forecasting thus focuses, with a great deal of magnification, on specific time relationships among specific indicators; it does not draw heavily on the general conclusion concerning the "scope" underlying expansions and contractions that was yielded by the National Bureau's statistical work.

A TIMING RELATIONSHIP BETWEEN THE INDICATOR AND BUSINESS

Viewed in this most general light, diffusion indexes, while they take their materials from the structural studies of diffusion, are also descendants of the "indicator" approaches to forecasting which have been common for the past half century. The close scrutiny of any business indicator as a forecasting device—steel scrap prices, freight car-loadings, stock prices, or any of a number of others that have enjoyed vogue in the past—assumes a specific timing relationship between the indicator and general business conditions, a fixed position in the "congeries" of activities that compose the cycle. This is essentially the same timing relationship depended upon in more general form by dif-

fusion indexes. What has been added is a considerable degree of sophistication in the testing of indicators for acceptable forecasting characteristics, drawn from the National Bureau's structural studies; and a set of sequential timing characteristics drawn from the same source, which permit gradual changes in the probabilities associated with a forecast by spreading the evidence through time. The multiple use of indicators also opens the attractive possibility that irregularities in the behavior of indicators will tend to cancel out.

An intermediate step in raising indicator forecasting to its present level of sophistication were the general business indexes developed at Harvard by Warren Persons² in the years immediately following World War I. In their original form, the so-called "Harvard Indexes" were drawn from the study of twenty-four statistical series, for which at least fifteen years of monthly data were available. Secular and seasonal trends were eliminated, and the series were expressed in standard deviation units. For each of the series, lead-lag correlations were used to determine relative timings, with Bradstreet's wholesale commodity price index as a central timing criterion.

GROUPS WITH SIMULTANEOUS TIMING

These studies resulted in a breakdown of the indicators into five groups of more or less simultaneous timing, with each of the later groups showing a significant lag behind its predecessor, and a total lag of twelve to sixteen months from group I to group V. Thirteen component series of the five groups were then interpolated into a theoretical model of a five-phase business fluctuation, leading from (I) depression to (II) revival, to (III) business prosperity, to (IV) financial strain and liquidation of securities, and, finally, to (V) industrial crisis. Speculative activity was considered to reach a peak in phases II-III, and to subside in phase IV; general activity, to reach a peak in phases III-IV, and decline in phase V, and banking activity (as measured by such series as rates on commercial paper and inverted bank reserves), to reach a peak in phase V, and decline in phase I.

These efforts culminated in a set of three indexes, representing (A) speculative activity, (B) general business activity and (C) banking activity, constructed retrospectively for the years 1903-1914, and eventually extended back into the last quarter of the nineteenth century. The sequential timing, as reflected in the lead of speculative activity and the lag of banking activity, seemed to fit the facts of business conditions in the early twentieth century quite well. For this period, for which retrospective tests of conformity were possible, they provided a considerable and on the whole fairly consistent lead over the National Bureau's reference cycle dates (a fact which is the more complimentary, of course, since the dates were not known).

In 1921, the original indexes were described as valueless

1. Footnotes appear at end of article.

for current forecasting, partly because many of the series remained under the influence of abnormal wartime phenomena, partly because some of the series had undergone a "break in continuity," and partly because changes in economic organization (notably the appearance of the Federal Reserve) had affected the behavior of some of the series. A postwar index was then constructed, mainly by elimination of series no longer considered sufficiently regular in their behavior. A revised three-part index, based on seven component series (revised to six in May 1923, and to fewer still in later years) behaved reasonably well in the peak and trough of January 1920 and September 1921, less well at the peak of May 1923, and rather poorly in the trough of July 1924. In 1925, in a supplement devoted to the interpretation of the indexes, their inconclusive behavior was attributed partly to "deliberate regulation of the business cycle by public officials."³

By the peak of October 1926, the behavior of the three series appeared to have lost much of its regularity; in fact, the so-called "business" index, which was presumably synchronized with general conditions, was itself declining during most of the rise leading up to the National Bureau's peak date. In 1927, there was no distinguishable relation among the series, and at the 1929 downturn their historical timing appeared to be partly inverted. Further eliminations of component series during this period seemed to yield no improvement. During the 1930's, the value of the indexes was more and more called into question, and their publication was abandoned in 1941. Throughout the 1930's, the "A" and "B" indexes maintained semblance of conformity, but the timing was highly variable, and eliminations of components had, in effect, made the device a "leading indicator" dependent almost entirely on the forecasting propensities of stock prices.

THE HARVARD INDEXES

The Harvard indexes bear an obvious resemblance to the leading-coincident-lagging classifications used by the National Bureau. (In Moore's list of twenty-one indicators with acceptable timing and conformity,⁴ stock prices appear as a leading indicator, industrial production and wholesale prices as coincident series and bank rates as a lagger. This parallels the placement of comparable series in the Harvard indexes.) Their resemblance to diffusion indexes is more remote. Unlike diffusion indexes, the Harvard indexes were at once statistical explorations and tests of hypotheses concerning the relation of three types of activity. However, the experience with the Harvard indexes is suggestive for diffusion forecasting. It is worth noting that they were constructed retrospectively for the entire period for which they would have provided very satisfactory forecasting results. Indexes constructed to serve a current forecasting purpose were found to lose their value as they were extended beyond the period that served as the basis for selection. This aging was associated with an increasingly narrow base of the indexes, as their coverage was progressively sacrificed to retrospective measures of regularity.⁵

In its beginnings, the work of the National Bureau eschewed hypotheses about causal connection within the business cycle, and turned to the measurement of individual

series. Its emphasis was placed on the sub-structure of the cycle, and thence on the "scope." The astonishingly intricate, overlapping, gap-filled mosaic of indicators on which the Bureau cheerfully went to work is a monument to its empiricism, and particularly to Mitchell's overwhelming capacity to refrain from hypothesis or generalization.

By the early 1940's, eight hundred series had been studied for purposes of identifying their cyclical turning points. This material on turning points, supplemented by resort to written records on business conditions, was used to confirm dates of turning points in the general business cycle itself. The so-called "reference-cycle" dates are thus placed (largely by definition) at or close to the point in time about which turning points in the individual series cluster. The general cycles so determined are divided into nine stages. Stages I, V and IX are the three months centered on the initial trough, peak and terminal trough, respectively. Stages II, III and IV represent an equal partition of the expansion phase, and stages VI, VII and VIII represent a similar partitioning of the contraction phase.

Each of the individual statistical series was seasonally adjusted, and then studied both for its specific-cycle behavior, i.e., its characteristic behavior in cycles determined by its own turning points, and its behavior during the general business cycles marked out by the reference-cycle dates. Behavior in individual cycles was expressed in terms of cycle relatives, with the cycle average equal to one hundred; secular trends were thus eliminated from the levels of the data, although their intra-cycle influences on turning points and amplitudes were preserved. This basic battery of measures permitted the determination, for each series, of a characteristic or average timing relative to the reference cycle; measures of conformity of timing of the individual series to the reference cycle; characteristic amplitudes in specific cycles and reference cycles; and average deviations of the cycle patterns from their averages (cycle-to-cycle variability).

CONFORMITY OF OVER 40 PER CENT SERIES IN THEIR CYCLICAL BEHAVIOR

These measures make possible a partially tautological but nevertheless useful restatement of the nature of the reference cycle. Of the approximately eight hundred series examined in Mitchell's "What Happens During Business Cycles,"⁶ well over 40% conformed in their cyclical behavior to the reference-cycle stages; i.e., they typically expanded in stages I-V, and contracted in stages VI-IX. A further small proportion (about 5%) behaved in precise inverted form, in most cases for understandable reasons, and may be counted as conforming series.

This high percentage of conforming series is, of course, the tide of the business cycle itself. A number of other interesting timing relationships to the general cycle were modestly represented. About 6% of the sample showed a one-stage lead at both peaks and troughs; another 9% showed a one-stage lead at troughs only, and another 2% showed a one-stage lead at peaks only. About 8% of the series lagged one stage at peaks; 1% lagged one stage at troughs, and 2% lagged one stage at both peaks and troughs. Two-stage leads (mostly at troughs) were found in 4% of the

series, and 2% exhibited two-stage lags (about equally divided between peaks and troughs). About 10% of the series were found to have no characteristic timing, and were classified as "irregular." The remaining 7% or so of the sample exhibited several varieties of inverted timing other than exact inversion, or were "neutral," i.e., their characteristic expansion phases were spread about equally between reference-cycle expansions and contractions.

This is admittedly a woefully incomplete summary of the National Bureau's research in this area. It is intended only to illustrate the building blocks with which diffusion indexes can be erected. But it is all that is necessary to say, to indicate that trends within the aggregate cycle shift gradually from consensus to diversity to new consensus, and that a measure of "scope" that is not drawn mainly from lagging or "irregular" series should move contra-cyclically in the later stages of each phase. The conclusion that the percentage of series expanding or contracting changes direction prior to change in direction of general business is, of course, implicit in the clustering of specific-cycle turning points about the respective reference-cycle turning points.

OBSTACLES TO ACCURATE FORECASTING

What obstacles confront the analyst who wishes to make use of this statistical thesaurus for forecasting purposes? Are there any general or systematic reasons why highly satisfactory forecasting devices cannot be constructed from the demonstrable lead of the "scope" over the aggregate?

There appear to be three classes of such reasons. In the first place, the application of the principle to current indicators vacates many of the statistical controls available in the retrospective composition of such an index. What is reduced to a truism in the reproduction of the past becomes an acute measurement problem for the future. These aspects of diffusion index construction have been well described by the Bureau as well as by others⁷ and no great amount of attention is paid to them here. It is necessary to note them, however, because they interact with other difficulties.

Secondly, diffusion indexes directed at the forecasting of general business conditions must be fixed-content, fixed-weight devices, if their historical record is to provide a guide to their interpretation. The individual series included in the index tend to age, to diminish in reliability or significance, as they are extended beyond the period which served as a basis for their selection. This aging may be slow or rapid. Even if it is found (in retrospect) not to have occurred at all in a period under examination, the continuous possibility of aging reduces the probabilities that can be associated with forecasts based on a diffusion index.

Finally, the several criteria by which potential indicators are judged tend to be mutually antagonistic. Efforts to improve the performance of the collective index in one respect tend to weaken it in other respects.

I. Difficulties with respect to interpreting the movement of individual series are a source of much of the disappointing behavior of current diffusion indexes. Even series with good conformity characteristics when viewed historically may contract (month to month) almost as many times as

they expand during an expansion phase, and vice versa. This intra-phase irregularity is a basic statistical problem in all forecasting. Smoothing devices designed to reduce the irregularities tend to erode the timing lead of the series, and may distort the cyclical timing itself.

SECULAR TRENDS DESERVE STUDY

In addition to this intra-phase irregularity, many otherwise desirable indicators contain significant secular trends. For structural analysis, it may be useful to retain these trends, and they are in fact retained in the National Bureau's procedures. (The asymmetrical distribution of leads and lags around peaks and troughs in the National Bureau's collection is owing in part to the predominance of secular up-trends.) Secular trends in individual activities influence the course of the business cycle, and in this causal context they certainly deserve study. But in the evidentiary context of diffusion indexes they are a disturbing influence. The secular trend is indeterminate in current analysis: it cannot be measured without assumptions that amount to a forecast. The degree to which secular trend is distorting the reflection of the cycle in the indicator under examination is accordingly unknown. One way of summarizing this is to say that the presence of secular trends makes the identification of cyclical turning points more difficult, since decisions about the location of turning points include masked decisions about secular trend. Another way of summarizing the same problem is to say that the decision to place a turn in an individual series at any point in time has different implications for the timing of a turn in general business conditions, depending on the relative strength of the secular trend. This is true since changing rates of secular trend account for part of the considerable cycle-to-cycle variation in timing found even among the more dependable individual series. The first expression stresses the uncertainties in locating the cyclical turning point in a specific indicator; the second stresses the uncertainty of the implications, once a turning point is determined upon.

Each component of the index thus presents the usual problem of separating secular and irregular (as well as seasonal) movement from the cyclical. These problems are readily met retrospectively; for current analysis they can only be "solved" by a loss of lead, i.e., by examining them retrospectively (as in the form of centered moving averages), and/or moving from binary decisions about turning points to probability weightings (as in the duration-of-run procedures used by the National Bureau and the National Industrial Conference Board).

II. A second element of uncertainty that enters into the interpretation of the diffusion index arises from its fixed composition. "Every business cycle is a unique historical episode different in significant ways from all its predecessors and never to be repeated in the future."⁸ This uniqueness is probably more characteristic of the cycle at the peaks and troughs, with which diffusion forecasting is concerned, than in the continuous phases of expansion and contraction that lie between them. The "content," as distinguished from the "scope," of turning points varies from cycle to cycle for cyclical reasons (related to structural and institutional changes), and for irregular (non-recurring) reasons.

A SENSING DEVICE

A diffusion index is a sensing device, and its perception depends upon the location as well as the number of its fingers. The change in "scope" recorded in the index's fixed range of perception will thus vary, depending upon whether the initial changes develop fully within, or only partly within, or not at all within its range. Students of business conditions can often guide their work by hypothesis about the nature and location of a real or prospective change in the cycle; this guidance of hypothesis is denied to the diffusion index (as it is to mathematical models) as one of the prices paid for mechanical objectivity and statistical continuity.

III. A final general category of difficulties is in the design of the index itself, in terms of the selection of components. The greater the number of series and the broader the coverage, the less acute becomes the fixed character of the coverage noted above. But the coverage may be extended only by the use of more series, and/or more comprehensive series. The addition of comprehensive series tends to reduce the average lead, since the more comprehensive the statistic, the greater the tendency to move simultaneously with the general cycle.⁹ Additions of large numbers of less comprehensive series lead toward series with poorer timing reliability, and greater intra-phase irregularity.¹⁰ By any of the more essential criteria for selection of a component, degree of lead, reliability of timing, or regularity of intra-phase movement, few indicators stand high.¹¹ And for each indicator, performance against each of the several criteria appears to be inversely related, to a degree. Performance of the whole index against one criterion can thus be improved only at some cost, in the form of reducing its performance against one or more of the other criteria. In short, Moore's five general criteria for an ideal statistical indicator cannot be satisfied by any one series;¹² efforts to satisfy the criteria by combinations of series tend to prove self-defeating.

MOORE'S INDICATORS

Moore's eight leading indicators provide a considerable average lead. But their leads are far from consistent, they are highly irregular in their intra-phase movement, as well as in their timing, and their coverage is so narrow as to allow continuous doubt about whether they adequately reflect the cycle to be forecast. Addition of the eight "roughly coincident series" certainly broadens coverage; most of these series are themselves broad, and a few come close to summarizing the entire cycle. However, they provide very little additional information: while their timing is much more regular than the leading series, it is also less significant. The five lagging series are easily the smoothest of all; their turning points are quite recognizable, but they occur, in most instances, after the stage of the cycle is itself recognizable. At the other extreme, Mitchell's sample of eight-hundred series has much wider scope; it provides much greater assurance that it will cover the content of a cyclical turning point. But its lead is doubtless much less than that of the eight leading indicators, and it includes many series whose timing and regularity have been poor in past cycles.

Compromises between these extremes, such as Moore's four-hundred series with "acceptable conformity" combine the virtues of the two extremes in lesser proportions.¹³

SERIES USEFUL FOR NONMECHANICAL FORECASTING

Finally, coverage of diffusion indexes is debarred from including those series whose timing characteristics are found to be "irregular" since in the mechanical view of a diffusion index a turning point in such a series (assuming such a point can be identified) would have no implication for the general business cycle. Ten per cent of the series examined by Mitchell fell in this category; there is no way of knowing whether this percentage is too high or too low. As Mitchell points out, irregular series are most often found in those activities which are not controllable over the course of the cycle (e.g., agricultural production) or which do not conform because the motivation of the activity is not related to the cycle (e.g., public construction). It is noteworthy that the very reasons that make these series unusable for diffusion indexes make them very useful indeed in non-mechanical forecasting. (One need only note the usefulness of statistics on the Federal budget.) There is also some reason for thinking that structural changes are increasing, if only slightly, the proportion of irregular activities, and probably also increasing the variability of timing among activities not now classified as irregular. For example, activity in the transportation equipment industry is now certainly influenced by the irregular behavior of defense orders and production. The importance of the "cyclical recalcitrants" to the cycle is certainly clear; diffusion indexes must largely ignore them.

The deficiencies of evidence and the resulting uncertainty that plague the user of a current index seem to be in some measure systematic. Efforts to reduce the uncertainties in any one stage tend to increase them in other stages, or attack the usefulness of the procedure by reducing the lead. The indexes themselves are likely to invoke a somewhat exaggerated confidence (followed by exaggerated disappointment) because the uncertainties arise in sequential sets of decisions (decisions about the series to be included, decisions about turning points in the component series, and, finally, decisions about the summation and interpretation of the index as a whole), and because the individual decisions appear to involve relatively small and offsetting errors.

FOOTNOTES

1. The subject of diffusion indexes is limited here to indexes directed at the forecasting of general business conditions. Use of the same procedures for known economic aggregates, such as employment, presents many of the same problems. Questions of "coverage" discussed below in connection with general business diffusion indexes are paralleled in the case of known-aggregate indexes by questions of degree of disaggregation.

2. Warren M. Persons, "An Index of General Business Conditions," *Review of Economic Statistics*, Harvard University Press, April 1919.

3. W. L. Crum, "Interpretation of the Index of General Business Conditions," *Review of Economic Statistics*, Supplement, September 1925, page 218.

4. Geoffrey H. Moore, "Statistical Indicators of Cyclical Revivals and Recessions," *National Bureau of Economic Research*, 1950, pages 64-65.

5. "It may be argued that slenderness of materials is no defect in a forecasting sequence; it is better to limit the series rigidly to those showing the closest approach to perfect regularity of sequence than to gain comprehensiveness at the cost of uncertainty. If it does not matter what is to be forecasted, this view is valid. Strictly speaking, all that can be inferred from a three-curve chart is the movements of the particular series represented by the curves which lag. Both for practical and for theoretical purposes the whole operation is highly important or a curiosity, according as the curves whose movements are forecasted represent activities of large or of slight significance."

Wesley C. Mitchell, "Business Cycles: The Problem and Its Setting," National Bureau of Economic Research, 1927, page 325.

6. National Bureau of Economic Research, 1951.

7. See Arthur L. Broida, "Diffusion Indexes," *The American Statistician*, June 1955.

8. Mitchell, "Business Cycles: The Problem and Its Setting," page 354.

9. This is true with respect to diffusion indexes because of offsetting tendencies in components of comprehensive series, and because by their nature they approach the content of the general cycle. In the National Bureau's historical studies of diffusion it is true for the same reasons, and also because turning points in comprehensive series were given greater importance in the selection of reference-cycle dates.

10. And, perhaps, to a higher probability that irregularities in behavior will offset and cancel out. There are two such types of irregularity that may be subject to canceling out; intra-phase irregularities, and cycle-to-cycle variability in the timing relationship of individual series to the general cycle. Any extended effort to weigh the importance of this canceling out as an advantage of a diffusion index over a single indicator would carry the author beyond his statistical

competence. A few observations, however, may be worth making. In the first place, the computer of a diffusion index must meet the problem of intra-phase irregularity individually for each series. What is subject to canceling out is thus not the irregularity itself, but the effects of the irregularity on decisions about turning points. With respect to variability in timing, there seems to be no a priori reason why substantial canceling out should occur; departures from historical timing on the part of individual series, at an individual peak or trough, doubtless involve systematic as well as random components.

11. How "high" they stand is, of course, a function of the rigorously of the tests applied.

12. "Statistical Indicators of Cyclical Revivals and Recessions," page 20. The criteria are (1) it must lead general business cycles; (2) its lead must be by an invariable interval; (3) it should be highly regular (that is, it must move smoothly upward from trough to peak, and smoothly downward from peak to trough); (4) its amplitude must be large enough to be readily recognized; and (5) it must provide confidence that its future behavior in regard to business cycles will be like its past behavior. These criteria are elaborated into eleven specific characteristics in following pages.

13. Such compromises may to a degree improve the results yielded by either of the extremes. The degree to which such improvement is possible depends partly upon the degree of inverse correlation among criteria; the higher the inverse correlation, the lesser the possible improvement. The author knows of no explicit tests of the relationship among the several criteria. Mitchell's thirty-four "comprehensive" series ("What Happens During Business Cycles," pages 256-257) suggest inverse correlation between conformity and lead; visual examination of Moore's leading-coincident-lagging series (op. cit., pages 70-73) suggests a strong inverse correlation between lead and intra-phase regularity.

IBM

172ND CONSECUTIVE
QUARTERLY DIVIDEND

The Board of Directors of International Business Machines Corporation has today declared a quarterly cash dividend of \$.65 per share, payable March 10, 1958, to stockholders of record at the close of business on February 10, 1958.

C. V. BOULTON,
Treasurer

590 Madison Avenue
New York 22, N. Y.
January 28, 1958

IBM

INTERNATIONAL
BUSINESS MACHINES
CORPORATION



DIVIDEND

Quarterly dividend No. 148 of \$.75 per share has been declared on the Common Stock of
**ALLIED CHEMICAL & DYE
CORPORATION**
payable March 10, 1958, to stockholders of record at the close of business February 14, 1958.

RICHARD F. HANSEN
Secretary

January 28, 1958

Continuous Cash Dividends
Have Been Paid Since
Organization in 1920

**Pullman
Incorporated**

361st Dividend and
91st Consecutive Year of
Quarterly Cash Dividends

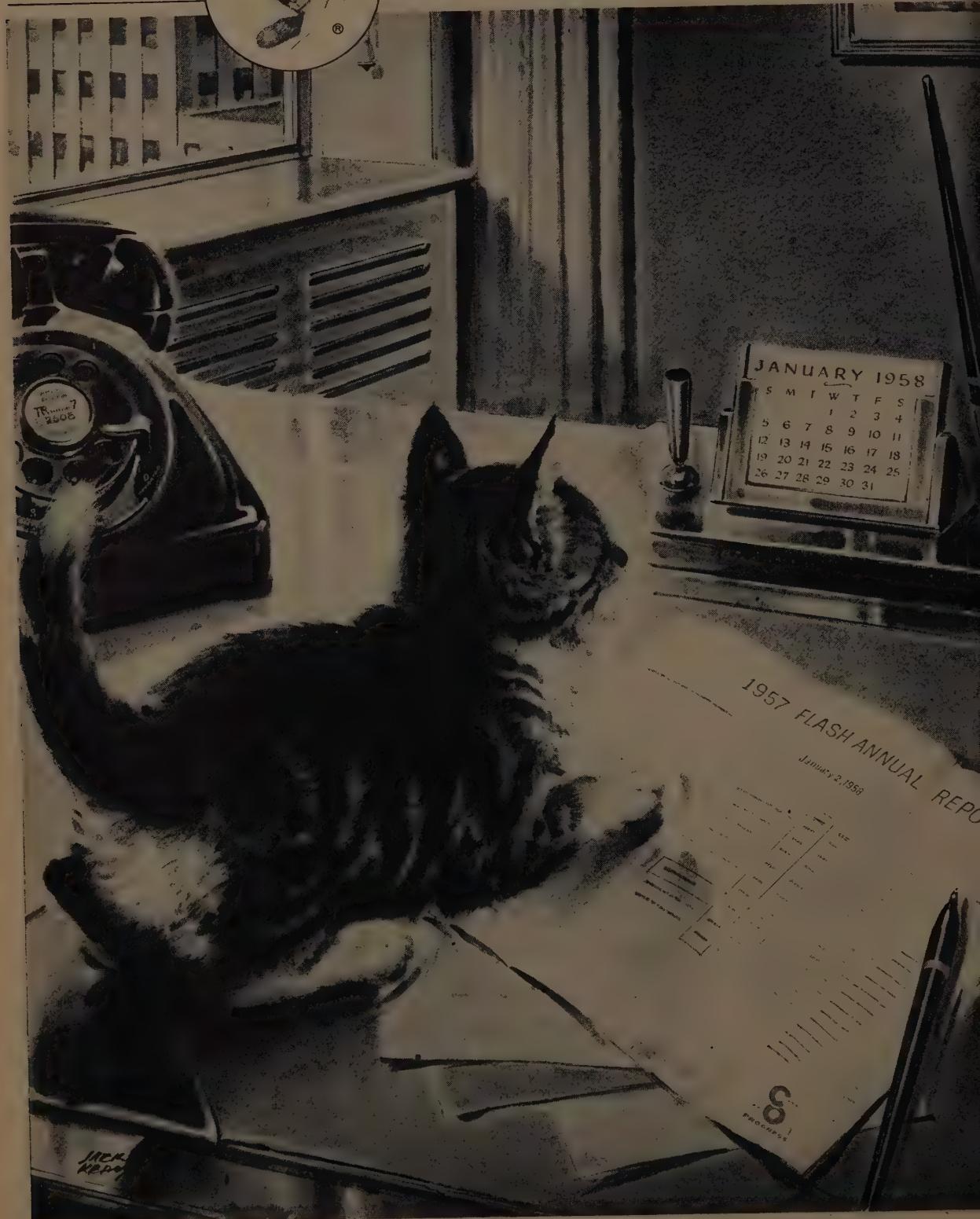
A regular quarterly dividend of seventy-five cents (75¢) per share will be paid on December 14, 1957, to stockholders of record December 2, 1957. An extra dividend of one dollar (\$1.00) per share will be paid on January 6, 1958, to stockholders of record December 16, 1957.

CHAMP CARRY
President



TRAILMOBILE

WHAT MAKES CHESSIE'S



Things move fast on the C&O

On January 2, 1958—first business day of the New Year—Chesapeake and Ohio published for its 90,000 shareowners a flash annual report of its 1957 operations. According to financial editors and security analysts, such fast reporting for a billion dollar corporation “makes corporate history”.

This up-to-the-minute reporting is just one part of a continuing forward looking program to give Chesapeake and Ohio shippers consistently superior transportation service. In addition to the modern coal classification facilities at Russell, Ky., a new fully automatic yard for merchandise freight goes into operation there this month. This \$5 million facility electronically classifies an endless stream of merchandise freight cars with push-button speed and measured control.

Thanks to the new Car Location Information Center—CLIC for short—shippers know that C&O traffic offices can tell them the location of their shipment almost instantly.

The capacity of C&O's coal handling facilities at Toledo, which last year established an all-time record of 18.7 million tons, will be sub-

stantially increased by the addition of a \$7 million pier now under construction. And at C&O's Port of Newport News, Va., export coal dumping was up one-sixth over the year-before record. Also, at this port a just-completed bulk cargo pier, most modern on the Atlantic coast, unloads ships faster than a ton a second.

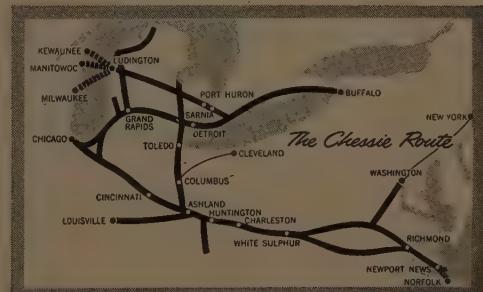
All these things mean that shipments move faster, more dependably, when you route them over the modern, efficient Chesapeake and Ohio. Chessie's railroad keeps growing and going!

ANOTHER GOOD YEAR FOR CHESSIE'S RAILROAD

Operating Revenues (millions)	1957	1956
Coal and coke	\$ 233	\$ 219
Merchandise	168	170
Other	31	30
Total operating revenues	\$ 432	\$ 419
Expenses, taxes, etc.—net	\$ 364	\$ 352
Net income	\$ 68	\$ 67
Earned per common share	\$8.36	\$8.28
Dividend paid per common share . .	\$4.00	\$3.625

Would you like a copy of C&O's “Flash Report” for 1957? Just write.

Chesapeake and Ohio Railway



Real Estate Syndications

HARRY B. HELMSLEY

THE FINANCIAL ANALYST THINKS of investment in the form of common stock, preferred stock or bonds.

There is another security which commands a great deal of the wealth of the country. This is investment in real estate. There has been a marked revolution in investment in real estate in the past ten years and it is a situation which should be understood because of the unique features which have developed.

In the past ten years we have found real estate investments for syndicates in which a total of \$150,000,000 has been invested in cash for equities in properties valued at \$400,000,000. This is just one part of the picture which has developed all over the United States. Where so many people are involved, and in our case it amounts to about 10,000 separate investors, there must be a good deal of appeal to the investment to have these people come back time and time again.

These investments have been made through cooperative purchasing in the form of syndicate groups.

Let us define syndication. Today's real estate man will define syndication to mean a group formed for the purpose of acquiring a property where the money is predominantly investment in character and then where the individuals are not professional real estate purchasers. There are many other syndicates formed to purchase real estate. Some syndicates are professionals who band together in order to augment their purchasing power or it may be a syndicate of a builder and a real estate man who join forces to construct a building, but for the most part these would not qualify for what we ordinarily know as the syndicate.

INVESTING COOPERATIVELY

In this article we will concern ourselves with those groups of laymen who have banded together to invest cooperatively in a real estate equity. In New York City, some of the larger properties which have recently been sold for syndication are: the Equitable Building, the Flatiron Building, the Lincoln Building, the Fifth Avenue Building, the Fisk Building, and such hotels as the Lexington, the Shelton, the Governor Clinton, and the Hotel Taft.

With such large buildings, it is obvious that no one individual will purchase the property, as the amount of cash involved is too large for a single investor and therefore the syndicate manager calls in his friends to help in the purchase.

This group action has brought about the raising of very large sums of money.

The investors who form this group are satisfied to have their funds in a permanent portfolio and they desire to remain with the investment indefinitely. This is natural because they obtain a yield of 1% per month and in addition have the added advantage of the amortization of the mortgages.

YIELD

Most syndicate investments in real estate show a yield of between 10% and 12% per annum and it is preferable that they be made only subject to a first mortgage. Therefore, while it is true that there is very little liquidity in the investment in the event that there is a thin market, nevertheless, those who invest do not look for liquidity. They usually have other funds which are invested in securities which are liquid. On the other hand, through having such a large group of investors, a market is immediately created for those who do want to sell. Actually, at the present time, there is a large waiting list for investments of this caliber. Therefore, anyone who desires to sell can easily do so.

The breaking up of the large sum required into small units has brought the small investor into the real estate field. Syndicates have made it possible for him to diversify his investments. He can put a varied amount into stocks, bonds and in real estate. He can take a piece of many different parcels of real estate and thereby spread his assets so that they are not all in one basket.

LARGER DEALS DISCLOSE ALL FACTS

Also, the larger deals are now being made by registration with the Securities and Exchange Commission so that there is a full disclosure of all the facts about the building. This is important because there are many deals which are being syndicated today which are not conservative and bear the possibility of future trouble.

Most of the deals which we were concerned with have been made over a first mortgage with institutional financing. A leaseback is set up which provides the 12% return and there should be a cushion to insure that the yield will continue. This lease provides two factors. It avoids the necessity of management by a large group. The lease group is a small partnership which provides for ease of management. It also avoids the problem of the syndicate being construed as doing business as a corporation because actually the syndicate group does no business except to collect one check a month and re-distribute it. Because this is a joint venture, there is only one income tax and the return to the investor is shown directly on his own income tax return with an offset for depreciation. This offset for depreciation is usually higher than the amortization on the mortgage and on the average there is between 30% and 40% of tax-free money on the investment. Actually, from a bookkeeping point of view, this means that the 12% return is divided into approximately 8% return on investment plus 4% return of capital.

DEPRECIATION HAS BEEN OFFSET BY INFLATION

In a period of inflation, we have found that the inflation has more than offset any depreciation and, as a matter of fact, the amortization on the mortgage has also inured to

the benefit of the fee-holder. Refinancing has been possible at the original face amount of the loan so that the funds paid in amortization have been recouped. In other cases we were able to revamp the payments covering the mortgage which accomplished approximately the same result.

As an example of what can be done, we had a purchase of \$3,750,000 and a mortgage of \$2,500,000 at 4% interest and 3% amortization seven years ago. After five years, the mortgage was reduced to close to \$2,000,000. We made a deal with the mortgagee to increase the rate on the mortgage to 4½% but to cut down the amortization to 1%. By that time the property had increased to a value of \$5,000,000, so there was really no reason for additional amortization. Here we had picked up \$50,000 per year of additional return. This means that on \$1,250,000 originally invested we were able to pay 4% more than we originally paid. At that time the rate was 15% on the syndication. The investors are now receiving 19% and I call your attention that this 4% is tax-free because our depreciation remains the same but the amortization is reduced.

As far as the institution is concerned, it is delighted to have the higher yield on a 40% mortgage rather than have us go out and refinance the property, which we could have done. We could have gotten additional money and have paid off the original investment. However, our people would prefer to have the investment in this property from which they have had good experience and 19% yield than to have their money back and then have to look again for a new investment.

ALTERED SYNDICATE YIELDS

It is interesting to note that some years ago we were syndicating on a much higher yield than we syndicate today. Fifteen per cent at that time was considered to be the proper return for equity. Today the return has declined to about 12% and there are deals being made as low as 10% to 11%. Paradoxically, interest rates on first mort-

gages have increased during the same period. You can remember when there was first mortgage money at 3½% to 3¾% interest and today the rate is 5½%.

In another situation, we were able to refinance the mortgage at the end of five years. We were able to refinance on such a favorable basis that we returned the original investment full and still had practically the same amount of money to give to the investors as they were receiving before.

This illustrates the importance of buying subject only to a first mortgage because the amortization on a first mortgage should eventually be additional return, barring a deflationary period.

Another feature of the syndicate deal is that usually there is a split of net earnings over a certain figure to provide for a safeguard in the event of drastic inflation. This way the investor is not left with a static return with no hope of a future.

SYNDICATE INVESTOR'S ADVANTAGES

You will therefore see that an investor in a syndicate in real estate obtains the following advantages:

He obtains a high yield.

He has an offset through depreciation so that a portion of the yield is tax-free.

He is able to make a comparatively small investment of about \$5,000 to \$10,000 and thereby diversify his investments.

He has the opportunity of protection in the event of inflation.

He has the opportunity of increasing his yield through refinancing or through a split of the earnings.

He has the protection of full disclosure through S.E.C. registration.

He can invest in prime property, well located, which he would be unable to do with a small investment alone.

STANDARD BRANDS

Incorporated

COMMON STOCK DIVIDEND

The Board of Directors declared a quarterly dividend of 50c per share payable March 15th to stockholders of record on February 14, 1958.

PREFERRED STOCK DIVIDEND

The Board also declared a dividend of 87½c per share payable March 15th to stockholders of record on February 28, 1958.

John B. Noone
Secretary and Treasurer

January 23, 1958

We are pleased to announce that Messrs.

PAUL F. CLARKE

ALLAN B. HUNTER

RICHARD P. OAKLEY

MARCEL A. PALMARO

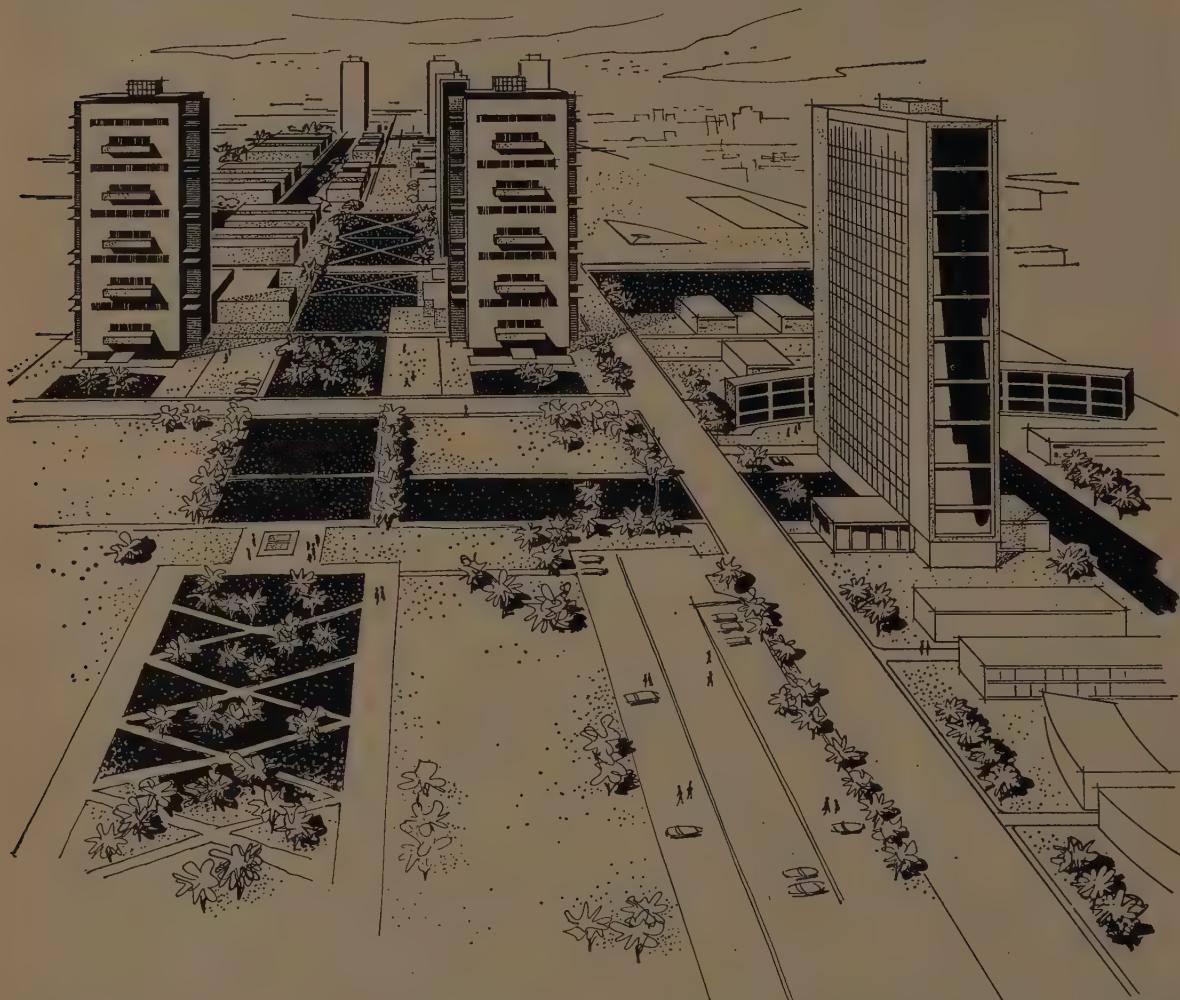
have been admitted to our firm

as General Partners.

LEHMAN BROTHERS

January, 1958.

ST. LOUIS' VITAL VALLEY...You won't find Mill Creek Valley on many maps, but the nation's businessmen are keeping a sharp eye on this 465 acres of land in the center of one of America's great cities...St. Louis.



Between St. Louis' downtown district and its fast-growing suburbs lies Mill Creek Valley. It is an area which has grown outmoded by the passage of time and by the move toward the west end of the city.

Now, in the new spirit of St. Louis, plans are underway to demolish nearly 2,500 old buildings in the Valley. Then, a vast and modern "suburb within the city" will begin to arise. In time,

apartments, stores and industries will flourish along new, sweeping boulevards. The cost: about \$300 million.

Other things are already happening in St. Louis. Three new expressways are being built. Land has been cleared for a \$15 million apartment and commercial project on the edge of the downtown district. In the business district itself, new buildings are being

built and extensive remodeling is under way.

In the decade just past, Union Electric, serving the power needs of this great city and surrounding area, has doubled its capacity, doubled its output. In the next five years, it will spend \$290 million for more expansion. Union Electric is a growing company in a growing community where progress and profits are being built.

UNION ELECTRIC

Stock Market Decline Ended?

CHARLES J. COLLINS

IT IS A GENERAL RULE, as concerns the long-range or several-year trend of stocks, that prices are moving up two-thirds of the time; down, one-third. The forward movements are gradual or deliberate; the declines, fast.

Fortunately, the advances are greater than the declines so that, on balance, upside progress in values is achieved. This is in keeping with a dynamic economy, such as that of the United States, where general growth is under way at a rate of 2½% to 3% annually. Periods of inflation that have occurred from time to time in world history because of important gold discoveries, or coin clippage, or wars, also have occasionally contributed to the advancing movement in share prices.

Following several years of advance, the market entered an irregular or sidewise price period in late 1955. During the last half of 1957, this gave way to price decline. Factors contributing to the decline have been psychological as well as economic.

Confidence in 1957 was adversely affected by a number of developments. The persistent effort toward tightening of credit by the Federal Reserve Board in its war on inflation reminded the investment, financial and business community that past actions of a similar nature by the Board had generally been followed by business retrenchment. There was disappointment over lack of vigorous leadership in Washington. Little Rock threw the great problems of white-black relationships into sharp focus. Finally, the Russian ICBM and Sputnik raised the question as to the adequacy of our military preparedness and revived the spectre of war.

At the same time, we were faced by a series of untoward economic developments. Quite a number of industries had built capacity to or beyond current demand, suggesting some letdown in plant and equipment expenditures. Consumers were no longer short of durable goods. Reconstruction needs of Europe were fairly well met and its dollar shortages threatened curtailment of its purchases of American goods. Compared with a declining rate of new orders, business inventories seem somewhat high and subject to downward adjustment. Construction of office buildings and stores was thought to have passed its peak. Persistently advancing wage rates were narrowing profit margins.

STOCKS DISCOUNT

Of course, the stock market, in its 1957 decline, took these unfavorable developments into consideration. Otherwise, it would not have gone down so in price. What is important at the moment is whether the discounting process is over or if the market has further travel on the downside before it gets into another important or sustained advance.

In answering the above question, there are two factors that should be considered. One has to do with the economic realities of the present situation. The other relates to the

internal dynamics of the market, referred to as the technical situation. How fully has the present decline satisfied the demands of each factor?

From the economic standpoint, we shall probably have to await the early half of 1958 before the effects on business volume and earnings of previously discussed adverse developments can be realistically appraised. Present consensus is that business decline of moderate proportions will be registered, running into the second or third quarter of this year. This analysis takes into account certain supporting factors as well as the deflationary influences. These supporting factors are the improvement in money conditions and the bond market following the Federal Reserve's action to ease credit; the continuing large defense expenditures, as well as prospects of their increase; advancing outlays by states and municipalities for public works; the mounting Federal road-building program; probable mild upturn in residential building in 1958; and a consumer buying power that promises to continue at a high rate.

Stocks discount business improvement as well as business decline. In this connection, the stock market, by turning up in September 1953, following nine months of decline, anticipated the business upturn of mid-1954 by around nine months. If the current business setback is to be confined to the moderate proportions mentioned above, the market, so far as this factor is concerned, could turn up during the early half of the current year.

TECHNICAL FACTORS

There are technical factors, however, that also must be considered. After a sustained advance, such as that from 1953 to 1956, stocks will frequently cancel from three-eighths to five-eighths of the move before renewing their uptrend. Such a cancellation, in the current instance, would lower the market, in terms of the Dow average, to an area the upper and lower limits of which would be 423 and 356, respectively.

As to how deep within the above 423/356 area the market will penetrate must remain an open question. The importance of the figures is indicated, however, by the fact that the first worthwhile rally since the decline got under way in July 1957 (the rally that began October 23 and, at this writing (January 6), is still irregularly under way) started the day after the market first penetrated into such area. A point worth keeping in mind, as one of final possible support and upturn, however, is around 385 on the Dow average.

First, 385 is the approximate halfway point of the above-mentioned 423/356 support area. Second, achievement of such a figure would also effect a minimum, or three-eighths, cancellation of the entire 1949-56 advance, an advance the 1949-51 leg of which was not technically corrected during the 1951-53 hiatus. Third, such a decline would equal 26%, or about the percentage of the 1946 decline and other

declines of the past that have fallen short of full bear markets. Fourth, a drop to around 385 would make contact with the prior market peak, that of 1929, a technical pattern the market sometimes observes. Fifth, the rally that ended in September 1955 with President Eisenhower's heart attack, and broke the backbone of the uptrend from 1953, began at 387.50 on the Dow. It would not be illogical for prices to retreat to that base point before starting the next major uptrend.

THE DECENTNIAL PATTERN

There is another technical factor to be considered. This has to do with the sharp character of the decline. Sharp breaks in stock prices, such as that recently seen, have occurred intermittently in this country's history. Among those witnessed during the present century, 1907, 1917, 1929, 1937 and 1946 stand out. Parenthetically, these breaks, as is true of the present one, have taken place at approximate ten-year intervals. Whether this is due to sun spots, which reach their intensity at eight- to twelve-year intervals, or some other recurrent extra-terrestrial phenomena, or whether this similarity of time interval is purely accidental, we shall leave to future investigation.

Each of the foregoing declines has followed a similar pathology, and it is this to which we wish to call attention. First comes the initial downtrend, or first phase. It proceeds with gradually mounting intensity to a point of climax, such climax being characterized by a fairly large volume of days' trading and then, turnaround. The turnaround, or rally, which we shall designate as the second phase, has run from two or three days to several weeks. Then renewed decline is witnessed that carries a majority of stocks, though not all, on materially reduced volume of activity, to prices somewhat below the points reached at the climax point. This is phase three. It marks the end.

In brief, stocks (1) decline on increasing momentum to a point where covering by short sellers, banking support, scale buying by institutions, and considerable odd-lot purchasing, is induced. This climaxing event breaks the momentum of the decline, permits (2) a normal rebound, or rally, as investors look over the battlefield, and is then (3) followed by a more deliberate down-movement, during which stocks individually and more leisurely readjust to the changed environment that the market decline, in its entirety, has heralded.

For those interested in technical minutia, we give data, in terms of the Dow-Jones industrial average, on the breaks under discussion in the two tables shown below.

If the decline under way mid-July last falls in the technical category discussed and tabulated above, and there are some considerations to suggest that it does, then several observations may be made. For one thing, the increasing intensity of the decline toward mid-October, and the large volume (over 5 million shares) witnessed on October 22, suggest that the climax point, or the completion of Phase I, may have been witnessed on October 22, the 70th day of the downtrend, during which interval the average declined 20 per cent. If such be the case, then the current rally marks Phase II, following which Phase III, that is, renewed decline of moderate proportions and relatively short duration is to be anticipated. It is during Phase III that stocks may be accumulated in anticipation of at least a 60 per cent recovery of the decline (November 1929 to April 1930 and October 1946 to June 1948, for example); at best, a resumption of the main, long-range upward trend. The one or the other development, that is, the customary 60 per cent retracement of a panic or semi-panic decline, to be followed by renewed liquidation; or, instead, resumption of the main upward trend, will depend, of course, on economic developments. If, as some feel, we are in a self-generating

SHARP DECLINES OF THE 20th CENTURY

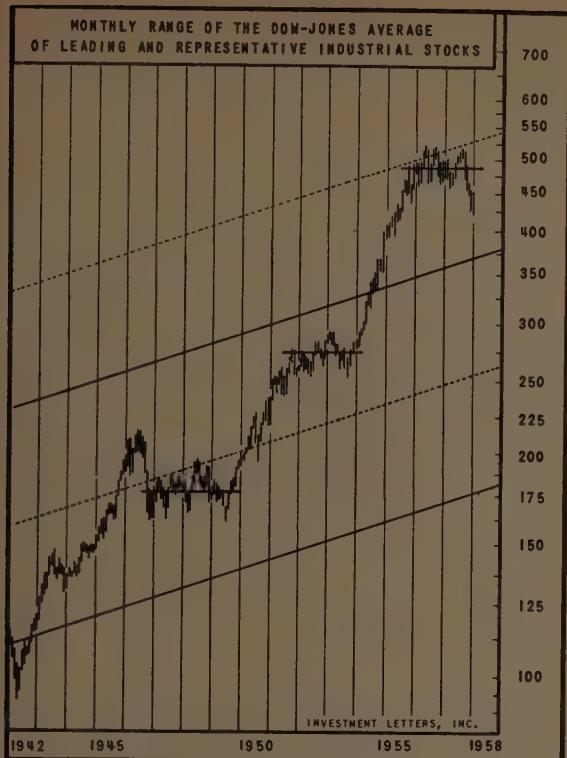
Starting Point			Climax Point			Rally		Culminating Decline		
Date	D. J. I.	Volume*	D. J. I.	No. of Days	% Down	No. of Days	% Rise	D. J. I.	No. of Days	% Beyond Climax
7/ 8/07	82	1.4	59	63	28	11	3	53	9	7
6/ 9/17	99	1.4	71	87	28	18	8	66	21	5
9/ 3/29	386	16.4	212	55	45	2	32	195	9	4
8/14/37	190	7.3	116	54	39	9	22	112	19	2
5/29/46	213	3.3	166	71	22	4	6	160	35	3

*In millions of shares.

Recapitulation

	Phase I		Phase II		Phase III		Decline in Its Entirety					
	Initial Break		Interim Rally		Culminating Decline							
	Days	% Down	Days	% Up	Days	Additional %						
7/ 8-11/15/1907	63	28	11	3	9	7	83	35	80			
6/ 9-12/19/1917	87	28	18	8	21	5	126	33	85			
9/ 3-11/13/1929	55	45	2	32	9	4	66	49	92			
8/14-11/23/1937	54	39	9	22	19	2	82	41	95			
5/29-10/30/1946	71	22	4	6	35	3	110	25	88			

*Per cent of total decline accomplished in initial break.



business decline that is to develop into a major depression, then the first sequence is to be anticipated. If, on the

other hand, the nation is going through a short business readjustment, as in 1948-49 and 1953-54, the second alternative seems probable. On economic developments, to date, we lean to the second viewpoint.

WAR

War is an anachronism. It is out of time and out of place in an economic society. If the current market is discounting the imminence of a major war involving this country, then a pattern different from that previously outlined on the basis of economic and technical developments is possible. But it is to be doubted that such a war is imminent; thus, it would seem that it may be ruled out as an important influence on the current market. Conclusion as to the improbability of war at an early date is based on recent authoritative opinion to the effect that the United States, operationally speaking, is currently even with, or ahead of, Russia in missile effectiveness.

Under different conditions, such as might be the case several years hence if we fall appreciably behind in the scientific and missile race, or if we lose Western Europe as an ally, there is little question but that Russia, under its present leadership, would move down through and over Turkey and Iran to envelop the vast oil reserves of the Middle East, annex the rich resources of virgin Africa, and obtain access to the open seas. But, considering the incalculable retaliatory destructive force of atomic warfare, and our existing operational equality or supremacy in such weapons, it hardly seems reasonable that Russia would essay such an adventure. If she does, it will be because the dictatorship has completely gone out of its head—a possibility, since it happened to Hitler, but not a probability.

* * *

If the quantity of our money were suddenly doubled, lands, town lots, the wages of labor, and every article, in short, whether of luxury or necessity, that is of domestic origin, would feel the full effect of the depreciation of money. In the case of excess money, it is almost sure to engender a wild spirit of speculation, both by affording the means and by stimulating the inclination, by reason of the increasing fictitious value which it imparts to some species of property. This spirit, once excited, draws men off from their regular pursuits, makes them look with disdain on the slow but sure gains of ordinary business, and hazard their capital and credit on rash schemes of profit, which, in much the greatest number of instances, are followed by disappointment, and not seldom by bankruptcy.—George Tucker

"One thing, then, is plain: that antecedently to custom growing from convention, there can be no such thing as usury; for what rate of interest is there that can naturally be more proper than another?"—Jeremy Bentham

"When a man enters the stock-market, he almost invariably operates for a rise. But when he sees how long it takes for stocks to go up, and how swiftly they sometimes fall—he naturally reasons that if, instead of operating for a rise, he had waited and sold short, or operated for a fall, he would have acquired wealth with a haste commensurate with his desires."—William Worthington Fowler



One Million Tons

The first car rolls through the newly-opened Hampton Roads Bridge Tunnel, a \$60,000,000 crossing financed by the *Virginia Toll Revenue Bonds* (Solid line). Southern Materials Company, Inc., supplied 1,000,000 tons of sand and gravel for this gigantic physical link that marks the beginning of a new era of progress for the Tidewater area!

Plans are now under way for an even mightier project—the Chesapeake Bay Bridge Tunnel (Dotted line). Estimated to cost over \$180,000,000, this vital link will join the Tidewater area and the Delmarva Peninsula, opening even broader horizons for the growth and development of the vibrant Tidewater area!



SOUTHERN MATERIALS

Headquarters: NORFOLK, VIRGINIA



For Our Company Review
Write: "Review"
P. O. Box 420
Norfolk, Virginia

The American Railroads in a Changing World

DAVID E. SMUCKER

DEATH AND TAXES ARE NOT THE ONLY SURE THINGS. Change is just as inevitable. But all things do not change at the same time, or by the same amount, or even in the same direction. So let us see if we can find some important transportation facts that are not going to change much in the foreseeable future.

One of the most basic of these unchanging and unchangeable facts, I believe, is the determination of the transportation buyer to use the cheapest transportation which will serve his particular individual purpose. His equations will continue to include many factors beyond the actual transportation charges such as relative cost of loading and unloading, of securing and protecting the load, of storage in transit. Under the heading of "service" are a group of other elements such as convenience, dependability, transit time, flexibility and sensitivity to individual and changing requirements. Factors of this character influence the choice of one mode of transportation above the others—they may be so important as to disqualify one type entirely but they represent what he buys with his money, not what he pays. They come into the cost equation when, for example, longer transit time requires greater investment in inventory or use of one form of transportation requires certain fixed facilities not needed for another. The transportation buyer will not spend more to get something that is not worth more, and we should not expect him to change.

HORSEPOWER STRENGTH

Another unchanging law of engineering and economics will continue to operate in our changing world—the low frictional resistance to a flanged steel wheel rolling along a steel rail. A 40-ton freight car, given a 60-mile-per-hour shove, will roll more than five miles on straight level track before stopping, while a 40-ton truck will coast in neutral on level concrete highway from 60 miles per hour to a stop in less than one mile. Four thousand horsepower will pull a mile-long freight train of 5,000 trailing tons. The same horsepower will propel 20 trucks aggregating 400 tons, or 50 passenger automobiles aggregating 85 tons, or one four-motor, propeller-driven airplane weighing 60 tons.

But that is not the whole story. The 4,000-horsepower locomotive uses fuel which costs about 11 cents per gallon while the fuel used by automobiles, airplanes and most of the trucks costs between 30 cents and 50 cents per gallon. So fuel costs to move 1,000 tons one mile range about like this:

Two-engine airplane	\$16.00
Four-engine airplane	8.15
Passenger type automobile	8.66
Truck and trailer combination	2.10
Average freight train	.165

The railroads now move about half of the inter-city

freight ton-miles with only one-tenth the amount of fuel that all other forms of transportation use to move the remaining half. In this changing world of ours that is Unchanging Transportation Fact No. 2.

TRANSPORTATION EMPLOYMENT

It has recently been announced that highway transportation employs more people than any other single American industry. The railroads, with about one million workers, are among the 10 largest industrial employers, but the productivity of this million people is striking by comparison. Railroad ton-miles per employee runs almost five times the similar figure for employees of inter-city motor carriers reporting to the Interstate Commerce Commission. The million railroad employees includes many thousands engaged only in maintaining the fixed property and tracks. If we divide railroad ton-miles by the number of railroad employees who actually operate the yard engines and the trains, the railroads produce 20 times as many ton-miles per operating employee as these inter-city truck lines. The railroads have adopted every technological advance that science has so far provided to further increase productivity and intend to continue to do so. This startling comparison of labor productivity is Unchanging Transportation Fact No. 3.

Railroad unit costs decline very markedly with significant increase in traffic units. Reduced to its simplest and most practical terms, it costs little, if any, more to move a freight car loaded with 500 tons than to move one loaded with 10 tons, or an empty car. Similarly, we can tie one, or two, or five more cars on almost any freight train, with virtually no additional cost. Where increased volume is sufficient, an additional train unit can be run over the same tracks and through the same terminals at relatively minor additional cost. Each of these minor additions to operating expense broadens the revenue base which supports the overhead burden of reserve capacity which is both the curse of the railroad business on declining volume, but a valuable asset on rising volume. By contrast, other forms of transportation find their cost almost directly related to their volume of business. Since they do not own or pay taxes or maintain any fixed right-of-way, or pavement, or rivers, or canals, their unit operating costs do not improve as volume increases—Unchanging Transportation Fact No. 4.

Let us look at the trend of freight transportation requirements to see what this peculiar volume-cost relationship may portend for the future of the railroads in this changing world. Total ton-miles by all forms of inter-city transport have increased more than six fold since 1900. Is that trend a part of the changing world that we are wondering about? Of course it is, but here again is evidence of a virtually unvarying relationship. If we adjust national income in each year of the twentieth century to dollars of current purchasing power, we find that in good years and bad we have required about four ton-miles of

inter-city freight transportation for each dollar of national income. It appears clear that transportation requirements during our industrial revolution were firmly geared to the aggregate earning capacity (and buying power) of all of our people.

Our population grows at an accelerated pace. The great bumper crop of babies born in the late 1940's and early 1950's will begin to form new families and buy new homes, and new furniture, and new appliances, and new automobiles, and have new babies, beginning less than five years from now and continuing as far into the future as we may care to look. We have adopted full employment and a rising standard of living as domestic policies and seem committed to both military and economic aid for non-Communist nations as international policies. It is becoming more and more apparent that we will tolerate inflation and big government and high taxes practically without limit. So probably the biggest single change that those of us interested in transportation have to keep in mind is one of enormously expanding volume.

TON-MILE REQUIREMENTS OF TRANSPORTATION

Undoubtedly, all of the forms of transportation known today will share to some degree in this imminent increase in ton-mile requirements. Coal pipe-lines, possibly even conveyor belts, operated either as carriers for hire or privately, may also find economic justification in the years ahead. But, in view of the twin policies of full employment and rising standard of living, we surely must expect both production and service industries to minimize their costs through seeking greater production per unit of energy and per unit of labor as both become more expensive. It seems only realistic to anticipate increased attraction to railroad transportation which can and should flow from its almost overwhelming advantage of inherent, built-in and undeniable economy in both of these fields, compounded by a basic costing structure so favorably oriented toward even lower unit cost on materially higher volume.

The history of the past couple of decades when the railroads made ineffective use of these same advantages proves only that they will not operate automatically. Regardless of the reasons why it has not been done sooner, there is compelling evidence that present-day railroad managers understand the need and are determined to commercialize these cost advantages by reflecting them in a pricing structure designed to do just one thing—maximize profits.

THE BUYER'S EFFORTS FOR ECONOMY

Generally I believe that we have discovered something that we have always known but were slow to recognize—the real basic fight in the transportation business is not among the various forms of transportation. This fight is between the buyer and the sellers of transportation. It is the age-old battle of the market place—the buyer determined to get a suitable transportation service at the lowest over-all cost to himself—against the sellers of transportation, each trying to win his favor. In our sales-minded economy "the customer is always right," so let us re-emphasize what he wants to buy—a suitable transportation service at the lowest over-all cost to himself.

Not the fastest,
not the most reliable,
not the one which costs its seller the least money,
not the one which costs the taxpayers the least money.
No, not even the one with the lowest price tag.

Our buyer of volume transportation, who shops in a gigantic super-market, is concerned with his cost. He does not care about the high-minded and long-winded debates on subsidy that have been going on for so long. The highways and the rivers and lakes and canals are there and he has to help support them with his taxes whether he uses them or not; the only avoidable charges are the user taxes. Let us look at what the transportation buyer for an automobile manufacturer has selected from the shelves of the transportation super-market—in his market cart we find this strange assortment:

Ore and limestone by water, by rail-water, and by rail-water-rail;
Coal by a combination of rail and water, or rail-water-rail, or all-rail;
Pig iron by water and by rail;
Casting and forgings by rail and by truck, including private trucks;
Engines by rail and by truck;
Sheet and strip steel by rail and by truck and by water and by all combinations of them;
Stamped metal parts by rail and by truck;
Set up automobiles by rail and by truck and by water and by every conceivable combination of the three.

Here is a real bargain shopper—his customers are bargain shoppers, so he has to be one too. If he cannot buy what he wants cheaply enough, he has to be something else too, a "do-it-yourselfer," sometimes just because he can save the 3% Federal excise tax that the cashier at the transportation super-market has to add to the total of his cash drawer tape.

Even though the competition is no less keen, this transportation super-market operates under rules quite different from those which apply in the Oriental bazaars of the East, the Flea Market in Paris, and the pawn shop district in our large cities, where free bargaining and endless haggling are the order of the day. The goods offered by the common carriers have the prices plainly marked and they are the same to everyone. He cannot get a discount for quantity buying and if he needs some accessory to make full use of this merchandise, he usually has to pay for it himself.

There are other brands on the shelves in a different section of the market where the price tags are only approximate. He can take the fellow who runs this department over into a corner and make as good a deal as potential volume and seller's cost will permit. Up to a few months ago they did not even mark these prices on the bags; he just got a slip which he put in his pocket and privately showed to the cashier. Neither had to tell his competitors what the price actually was. This occurred in the contract carrier segment of this transportation super-market, a section where the railroads with their common carrier duty and legal obligation to avoid discrimination (imposed when

they had a monopoly) have been prevented from competitively displaying their services for sale.

In the days of virtual transport monopoly, railroad rates from various origins to a common market could encourage or discourage industrial development in newer sections of our country. Marketing systems which priced a ton of steel anywhere at a posted figure plus rail freight from Pittsburgh, or a barrel of Portland cement at a posted figure plus rail freight from the nearest cement mill, depended entirely on maintenance of relative freight rate relationships. So Congress wrote into the Inter-State Commerce Act prohibitions against rate discrimination, not only as between persons but as between localities as well. New companies were encouraged to establish themselves and older ones to decentralize, using their freight savings below the established prices to maintain themselves while their volume, their natural market areas, and their competitive position were being established.

MARKETING QUALITY ALTERED

The plainly marked prices in the common carrier section even today must maintain these historical relationships to similarly marked prices in transportation super-markets all over the country. While the rail rate law has not changed, the marketing equality which it was supposed to protect may have been radically altered by lower rates offered by carriers in some other form of transport available at one source of a material but not at another. In such cases the railroads have been forced to stand by and watch a volume buyer divert his business to some other section of one transportation super-market for a rate that the railroads could profitably meet just because they could not afford to make relative reductions in every other super-market where such competition did not exist. The fixed price tag in the competitive market has actually preserved nothing but a theoretical relationship, a theory that can never apply in any competitive market, including the competitive transportation super-market. As in every business, transportation prices should be established and quoted to encourage profitable sales and not for any other reason.

The great body of rates, commission orders, court findings, and here and there modifying legislation have woven a strong fabric in which "Value of Service" as a basis for rates is both the warp and woof. But the value of a particular rail service may be vastly different as between two shippers right in the same locality. An off-rail shipper who would have to haul his freight to the nearest public team track for rail shipment obviously gets more value from the dollar he pays a truck line than does a neighboring shipper whose plant layout includes adequate, conveniently located private sidings. Some of the distant customers of this off-rail shipper may also prefer to receive by truck while others minimize their handling costs at destination by demanding rail shipment. Rail freight rate adjustments cannot be confined to shipments from the plant of our off-rail producer, so the only solution for a situation of this kind lies in adjustment of the rail service offered to shippers of this type. Piggy-back service, which has grown phenomenally, is but one step in the direction of meeting some such practical realities. If rail service cannot be modified

to make it as valuable to the man who pays the freight charges as other available service, then I think that particular business is gone forever—this is exactly what the National Transportation Policy contemplates.

COSTS OF MOVING A CAR

Where the rails have been able to overcome the confining tendencies of regulation applied from within the industry itself as well as from without, there have been some shining examples of success in arresting diversion by rate adjustments which reflect favorable rail cost factors. Remembering that it costs virtually no more to move a car loaded with 50 tons than one loaded with 10 tons, and not forgetting that successful competition requires matching strength against the competitors' weakness, the railroads published some dual based rates, naming lower charges per ton for movement of heavier carloads of a particular commodity without disturbing rates applicable to lightly loaded cars. Successfully fought through against stern opposition, these rates are today responsible for greater interest and increased purchases in the rail section of the transportation super-market. We are a long way from home and what has been done is but a start. The people who conceived these pricing innovations and fought them through are encouraged by the results, and, since nothing succeeds like success, one may be confident we will see more of them in our changing world.

Rate adjustment alone, no matter how conceived, is not always effective in recapturing lost tonnage. The movement of thin-rolled steel products offers a fine example. It costs less to block and brace and protect a load of steel against damage from shock or weather by truck than by rail and the difference was sufficient to outweigh price tag differences. Steel mills were originally laid out for rail transportation to, between, and from, the various plant elements. Yet the steel buyer who could reduce the laid-down cost of automobile steel by resort to something as simple as a flat bed trailer, a couple of log chains and a tarpaulin, used his purchasing power to force a revolution in the transportation practices of the steel companies.

The inter-play between buyer and seller and the necessity to maintain relative rail rate levels made rate adjustment ineffective. Restoration of the rails' former position in the competitive transportation super-market required an adjustment in service as well as price. I am rather proud of the part that the D. T. & I. played in this counter-revolution, since we had 65 specially equipped cars (designed to minimize shippers' costs of loading and protecting coils of automobile steel) in service while some other roads were gingerly experimenting with one or two cars. This was just a natural extension of our fleet of cars specially equipped for handling auto parts which has held this business on the rails through meeting the particular and changing loading requirements of the shippers.

RAIL COSTS AND RELATIVE VOLUME

Every rule of philosophy and business morality suggests and competitive success demands that a low cost form of transportation reflect the cost advantage in its competitive pricing structure. Some people are urging complete aban-

doment of the older "Value of Service" concept of rate making in favor of a new theology based solely on cost of service. Yet actual rail costs vary with relative volume, diminishing as volume rises and increasing as it falls. Further, it costs no more to move a car loaded with 50 tons of diamonds for 500 miles than one loaded with 50 tons of coal for the same distance, yet equalizaiton of rates would not move more diamonds. Clearly, "Cost of Service" alone is not the means through which lower cost characteristics may be reflected in competitive prices. It must be applied with care and in conjunction with other factors.

The thing that must be kept in mind in competitive pricing of transportation services is this, the value of a particular service can never exceed the full cost to the shipper or consignee of an alternate service including private transportation which he can provide for himself. Subject to this practical ceiling, "Value of Service" appears still to have practical value in rate making. If this had been recognized years ago, we would not today be forced to hold a gigantic umbrella of paper rates over the heads of our competitors—paper rates so far above our costs that they not only will not move the business, but permit other less economical forms to continue to handle it profitably. The best evidence that this is true is found in the vigorous protests from motor carriers and water carriers against rail proposals to fold up the umbrella, reduce rail rates, and restore competition where it could be done at a profit. Competitive prices should be established to encourage sales and not to preserve some paper relationship or for any other reason, including the specious one that it will be good for our competitors since it will result in a "fair distribution of the available traffic," a favorite phrase of regulators in rejecting such proposals.

Obviously, we need to know more about our own costs, our shippers' accessory costs, our competitors' costs, before we can devise a fully competitive structure. One of the most encouraging developments in this direction is the cost research project instituted by the Eastern railroads under the leadership of Dr. James E. Lyne, who for a long time has been hammering away at transportation pricing reforms in the columns of his magazines. One may be reasonably certain that railroad pricing reform based on actual facts in lieu of interesting theories has taken its first sure step toward fundamental changes geared to our changing world.

REGULATIONS AND CHANGE

We require the opportunity for bold experiment, for trial and error and correction. A force which will have over-riding influence on any changes which the transportation buyer may expect in our changing world is the force and influence of external regulation. If the recent past is a reliable guide, the attitude of the Interstate Commerce Commission has undergone a remarkable change. The philosophy of its distiguished members bears scant resemblance to anything we have been accustomed to encounter.

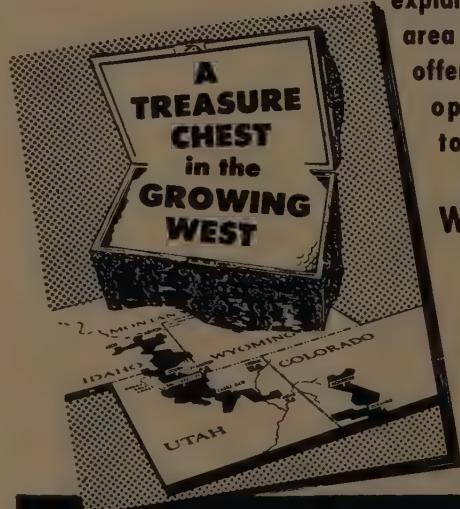
Viewed in its largest dimension, it seems clear that the Commission and its members join other informed groups in a firm conviction that the changing world has already wrought a need for basic changes in transportation regulation so far beyond the views of this body a few years ago as to be phenomenal in scope. Of perhaps greater importance, there seems to be a brand new sense of urgency and an acceptance of responsibility.

Alterations in regulatory theory and practice could not precede an acceptance of the need for change but progress does not require that everybody agree on the relative desirability or effectiveness of a particular measure. Some may be willing to go further than others and thoughtful individuals may change their minds as situations develop. This new attitude is the most encouraging development in recent years toward a guarantee that transportation will be not only permitted, but urged and encouraged to progress and to keep in step with our changing world. Carried to a logical conclusion, it is a further guarantee of ultimate restoration of railroad securities to their former blue chip investment status.

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Forecasting 1958

ROBINSON NEWCOMB

IT TOOK MANY CENTURIES to transmute the art of the alchemist into the science of the chemist. It may take even longer for the economic forecast to undergo the metamorphosis from art to science. It may not be an altogether happy metamorphosis. Some forecasters are real artists. And to make a science out of predicting what people will do means reducing people to puppets dancing to the laws of probability. And it means making economic data exact data.

Even if we succeeded in making good Calvinist predestinationists out of every person, it would still be necessary to have accurate data about people in order to predict what people will do. It may be almost as difficult to make economic data scientifically measurable as to make people predictable creatures of known laws.

A hopeful approach to forecasting singles out data which tend to lead trends in activity. But this is a highly dangerous approach, used only with great hesitation by those who know its limitations best. For example, one of the series which some have felt might be a good lead series is residential construction contracts. But this series has two major weaknesses. The series as reported in the 30's differs from the series of the 20's. The staff collecting the data were increased and better trained in the 50's than the 40's. The series for 1956 as now reported is based on entirely different sources (largely permits and samples) than the sources used as late as 1955 (field staff). Moreover, the revised 1956 series is quite different from the original 1956 series. And the Government has just announced the finding of serious omissions in its reporting of housing starts.

In addition, the market behind the series is quite different now than it was in the 20's or the 30's, or from 1947-50, or 1950-55. Single-family housing started to drop in 1923, but speculatively financed multi-family housing rose for several more years. The drop, when it was reported in the contract series, resulted from a drop in speculation in multi-family bonds and mortgages. There is no similar speculative fever holding up apartment bond sales today. Nor are today's home buyers or renters duplicates of the buyers or renters of even 10 years ago.

WHAT IS BEHIND DATA

So both the data and the markets behind the data are sharply different from the data and the markets of 10-30 years ago. The fact that the former data led in particular times in the past need not imply that the data of the present will lead in particular times in the present or the future.

It is necessary to know what is behind the data to catch even a glimpse of what the data may signify for the future.

The residential contract figures are not unique. (Except possibly for the fact that they have been greatly improved. Recent Census studies, however, show that they still have quite a ways to go.) Other common data also are very dangerous. Even such statements as lumber orders, freight

car loading, production of electricity, are quite tricky.

Or, look at the new order index. It is nicely weighted with auto sales. How else would you include orders for new cars? The auto industry must get in somehow. But how many people, as they gravely or cheerfully peruse the new order index, realize how it is built up, and the many pitfalls it necessarily, and lavishly, presents? There is scarcely a datum but can be shown to be of limited usefulness, and hazardous to exploit. While this condition lasts, forecasters must be artists, though we may clothe our prognosis in erudite words and esoteric formulae.

EVALUATE THE FACTS

With this premise, and large scale hedge against failure, let us examine some of the befuddling facts.

It does not make much difference where we start. Let us begin with a forecast prepared at the end of last September for a meeting of clients held October 13, 1957. This projection suggested that the rise in business would continue through the 4th quarter of 1957, then level off for nine months. This particular projection started off with the assumption that the Government would not be able to cut military expenditures much better in 1958 than it was able to raise them as promised in 1953.

In terms of its impact on the economy, military expenditures went up less than \$3 billion from 1952-53, though the defense establishment promised they would rise over \$10 billion. It is very difficult for the Government to make sharp changes, either up or down. Russia was known to be gaining in the missile field. The conclusion was reached that security expenditures would not drop by much over \$2.5 billion to a level of about \$44 billion, rather than \$8 billion to the \$38 billion level forecast. This was a drop of about one-third as much as forecast. It was known that other Governmental expenditures, such as highways, schools, salaries, were rising. It was thought to be a fairly safe judgment that total Government expenditures by the end of 1958 would be at least as high, and possibly higher than at the end of 1957.

Private investment expenditures, of course, were expected to drop. But residential builders had learned how to tap savings and loan associations, and individual savers were willing to make second mortgages. Consequently, the volume of housing was not dropping as might have been forecast on the basis of the flow of institutional savings. Further, about one-third of residential construction is outside the field of single-family houses. This third, particularly the portion represented by such structures as hotels, motels, and other institutional or semi-institutional construction, could proceed without all the obstacles which single-family housing faced. Detailed analysis of age and sex and income distribution indicated a potential household formation of about 850,000 for the year, and the preliminary census data indicated the probable disappearance

GROSS NATIONAL PRODUCT PROJECTIONS*

Assuming tax cut as of July 1, 1958, if needed.

(In billions of dollars, at annual rates)

	1957			1958			
	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Total	434.3	439.0	442.0	443.0	442.0	442.0	446.0
Personal consumption	278.9	283.2	288.0	290.0	292.0	293.0	296.0
Durables	35.0	34.7	36.0	36.0	36.0	36.0	37.5
Nondurables	139.1	142.5	144.0	145.0	145.5	145.0	145.5
Services	104.9	106.0	107.0	109.0	110.5	112.0	113.0
Gross private domestic investment	65.0	65.5	65.0	64.0	61.5	61.0	61.0
Non Residential constr.	18.9	19.0	19.1	19.0	18.8	18.7	18.5
Residential constr.	13.9	14.0	14.2	14.4	14.6	14.9	15.0
Producers' durables	30.5	30.5	30.2	29.6	29.6	29.4	28.5
Inventory	1.7	2.0	1.5	1.0	-1.0	-2.0	-1.0
Net foreign investment	3.5	3.0	2.0	1.5	1.5	1.0	1.0
Government	87.0	87.2	87.0	87.5	88.0	89.0	90.0
Federal, total	51.3	50.8	50.0	50.0	49.5	49.5	50.0
National security	46.3	46.0	45.2	45.0	44.0	44.0	44.6
Other	5.3	5.2	5.2	5.5	5.7	5.7	5.7
Non Federal	35.8	36.4	37.0	37.5	38.5	39.5	40.0

Fiscal Years (Billions of \$)

Federal Expenditures and Receipts	1957	1958 Estimates		
	Actual	Jan. Est.	Oct. Est.	Panel Est.
Budget Expenditures	69.4	71.8	72.0	73.0
Budget Receipts	71.0	73.6	73.5	73.5
Administrative Budget Surplus	1.6	1.8	1.5	.5
Payments to the Public (net)	79.9	82.9	82.8	83.8
Receipts from the Public (net)	82.1	85.9	85.9	86.5
Cash Budget Surplus	2.1	3.0	3.1	2.7
Major National Security	44.3	44.4	44.1	44.5

*This is a consensus of expert Washington opinion interpreted by Dr. Robinson Newcomb and Dr. H. D. Kreager, as of September, 1957.

of between 350,000 and 400,000 existing residential units. After allowing for new units provided by conversion, the market seemed strong enough to support the building of 1.2 million units as reported by the BLS, and probably 1.3 million as counted by the Census. This would require a net new flow of funds as reported of less than \$1 billion.

PROJECTING RESIDENTIAL CONSTRUCTION

As industrial demands for investment funds appeared to be dropping slightly more than Government demands were rising, it seemed safe to project a residential construction figure, in terms of the amounts reported by the Government, which understate the total, at a \$15 billion annual rate by the last quarter of 1958.

Detailed analysis by type of non-residential construction similar to that made for residential construction, including an allowance for a drop of 10% in industrial building, indicate a drop of possibly \$600 million in the private non-residential building outlays. It was believed that this overstated the probable decline.

The general expectation at the time was that producers' durables would drop by about 10%, but we judged this expectation to be influenced by the current pessimism. Putting all the private investment data together, we come up with a drop of about a \$4 billion annual rate from the end of 1957 to the end of 1958.

Assuming consumers continue to spend about 94% of their incomes, this would indicate a total disposable income in the neighborhood of \$315 billion for the fourth quarter of 1958. This figure, of course, was reached after relatively elaborate calculations of employment required and of trends in wage rates. It gave a total GNP at the end of 1958 of just about \$446 billion.

Three months have elapsed since this analysis was made and it is possible to begin to see some of the errors in it. The total estimated GNP in the third quarter is exactly the figure reported by the Department of Commerce. But the details do not quite match. Personal consumption was .2 billion higher than estimated, private investment was .5 billion higher, Government purchases were .8 billion lower.

The figures as reported will be revised, and may be revised upward within a year or so. It now looks as though the fourth quarter of 1958 would be originally reported as closer to \$433 than to \$442 billion.

Part of the difference between the forecast made at the end of September and the way the data looked today may be accounted for by the fact that we moved into the recession vigorously, instead of drifting into it slowly, as forecast.

NEW STYLES MAY ENCOURAGE BUYING

If the new housing and the new clothing styles, among other things, encourage what may be a readiness on the part of consumers to come back into the market, and if the wave of pessimism running rampant from October through December is checked for this and other reasons, the general level for the end of 1958, as given in this projection, may be met, though the \$6 billion loss in the fourth quarter of 1957 may not be made up. The year may end not far from \$444 billion.

The projection assumed a tax cut, if needed. If unemployment should rise, and the action of the Fed in easing credit terms came too late, the Federal Government may cut taxes even though this means an unbalanced budget. A new factor has entered here. The Joint Economic Committee has proven that its judgment as to the need for tax cuts from the standpoint of economic growth has been very good. The standing committees concerned have developed a good deal of respect for the work of the Joint Economic Committee in this field. Should the Joint Economic Committee decide that without a tax cut we may have serious unemployment, the other committees would listen even though the tax cut meant a deficit. It was felt, therefore, that it was possible to project disposable

income with more confidence than total personal income. The Government can influence the total of disposable income slightly more readily than the total of personal income.

THE IMPACT OF EACH SEGMENT ON THE WHOLE

This type of forecast is based on detailed analysis of the strength and weakness of each segment, and its current economic and psychological relation to the economy as a whole. The housing forecast included detailed analysis of household formation, income distribution, construction prices, and availability of capital from institutional and non-institutional sources. The forecast was not based on detailed statistical relationships because, as discussed at the beginning of this analysis, the internal composition of industries and the statistical relationships between industries are changing too fast and too significantly to make most past statistical relationships valid for projection purposes. This, as any other method, must estimate what business and consumer attitudes will be; it must estimate what steps will be taken by business and Government to counter unfavorable psychology not based on solid fact. If we are poor psychologists and do not estimate what business and Government will do to modify waves of over-optimism or over-pessimism, then this type of projection will result in errors. The projections which we have been making for the last decade using this type of approach have never been too high, though this, of course, may be the projection which breaks the charm. To the extent analysts can anticipate what the basic forces will do to each segment of the economy and to attitudes, and what steps may be taken to affect the forces, this method of analysis, detailed sector by detailed sector, may continue to prove useful.



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of 50¢ per share on Common Stock, was declared by the Board of Directors on January 10, 1958 payable March 15, 1958 to stockholders of record on March 4, 1958.

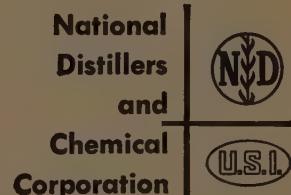
A. H. DAGGETT
PRESIDENT

ST. PAUL - MINNESOTA

OUTBOARD MARINE CORPORATION
DIVIDEND NOTICE

A cash dividend of twenty cents (20c) per share on the Common Stock of the Company has been declared by the Board of Directors, payable February 25, 1958 to stockholders of record February 3, 1958.

H. M. FISHER, Secretary
January 17, 1958



DIVIDEND NOTICE

The Board of Directors has declared a quarterly dividend of 25¢ per share on the outstanding Common Stock, payable on March 3, 1958, to stockholders of record on February 11, 1958. The transfer books will not close.

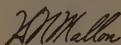
PAUL C. JAMESON
January 23, 1958. Treasurer

DRESSER reports

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1957 sales, earnings both UP 19%

The Dresser companies continued their long record of growth in sales and earnings during the fiscal year ended October 31, 1957. Total sales were \$274,429,000 and net earnings after taxes amounted to \$20,620,000. Both of these represent increases of 19 per cent by comparison with the prior year. This growth is particularly encouraging because it occurred at a time when the general economy had ceased to expand and when certain of the Company's principal markets actually declined. That growth did occur despite these developments is attributable to extensive diversification within the Company's principal markets, the oil and gas industries, and a demonstrated ability to better serve the Company's customers in these essential areas. Dresser anticipates that sales during the year ahead will approximate the 1957 level.



H. N. Mallon
Chairman of the Board



J. B. O'Connor
President

FINANCIAL HIGHLIGHTS For the fiscal years ended October 31

	percentage change	1957	1956
Sales	+19	\$274,429,208	\$230,292,232
Earnings	+19	20,620,453	17,258,979
Heavy Equipment Backlog	+ 1	71,302,000	70,306,000
Working Capital	+28	92,498,920	72,389,634
Ratio of Current Assets to Current Liabilities	+ 7	3.0:1	2.8:1
Net Property	+30	62,232,807	48,015,066
Shareholders' Equity	+19	114,264,342	96,017,231
Number of Shareholders	+15	15,050	13,038
Per Share:			
Shareholders' Equity	+15	25.51	22.10
Earnings	+19	4.60	3.85
Dividends	+31	1.80	1.37½

COMPLETE 1957 ANNUAL REPORT ON REQUEST

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An Investment Trust Views the Rails

FELIX C. SMITH

AFUNDAMENTAL FACT which emerges when studying the field of ground transportation is the vital dependency of a strong and growing economy upon a sound transportation system in which the railroad industry with its enormous capacity offers the primary economic means for mass movement of goods and materials without which our economic system in all probability would wither and die. Moreover, when reviewing the wide-scope technological improvements and greatly changed operating techniques produced in rail transportation in the post-war decade, another basic fact which emerges is the dynamic physical and financial progress that was accomplished despite the counter-effects of continuous inflation as well as the unfavorable and wasteful competition which follows when freedom of enterprise is circumvented by long outmoded concepts of government regulation.

POST WAR YEARS REWARDING

From the viewpoint of the investor, the results of the post-war years were considerably rewarding. Income available to meet charges on corporate railroad debt increased over 70% in the period. Despite the huge increase in equipment debt, most of which was issued to purchase diesel locomotives, the large reduction in obligations carrying burdensome coupons allowed an over-all reduction of interest charges of 16%. Thus, coverage on debt was substantially improved.

Net income at the end of the period was nearly treble the net reported in the first full post-war year of 1946, and dividend disbursements were up almost 90%. Market prices for rail stocks represented by the Dow Jones average rail price index rose 193% from the mean of the high and low of 1946 to the mean of 1956. This was an even greater percentage improvement than the 162% increase in the mean recorded by the Dow Jones industrial list.

These results were achieved on a different basis from what normally would have been expected in the light of the business boom of the post-war decade. Whereas total intercity ton-mile volume in the United States increased some 48%, the rails received only 12.6% of the gain, while other forms of transportation including the booming trucking industry which handled 34% of the increase, took the balance and chopped the rails' share of the national transportation market from two-thirds in 1940 to less than one-half in 1956.

Thus, contrary to what otherwise might have been expected in a less competitive environment when there was considerable business and industrial expansion, the rail industry was unable to post more than a 10% increase in traffic handled. The fact that a gain of 38% was registered in operating revenues in the face of the small increase in traffic was due mainly to a 40% increase in revenue per-ton-mile effected by a series of cumulative rate increases during the period.

In view of this experience, how was the rail industry able

to register the impressive profits through which investors in rail securities were so amply rewarded?

RESULTS OF LEVERAGE

Actually, it must be recognized that the final results were influenced by the leverage in rail profits caused by high fixed costs and heavy operating expenses. The real basis upon which the profits were registered in the face of such a relatively minor increase in revenues must be attributed to the alertness and ability of modern rail management to control costs to the point where operating expenses were held to a 28% increase, notwithstanding the 66% rise in average annual wages.

The fact that management was able to limit the rise in expenses to such minimum proportions despite a sustained period of spiralling costs in which the rail industry was particularly vulnerable with its high employment factor and large material requirements is certainly most remarkable. Nevertheless, by virtue of some \$12 billion expended during the post-war years for capital additions and betterments, which greatly upgraded the run-down plant existing at the end of World War II, substantial operating economies were effected which resulted in trimming employment by 23% and increasing the productivity of the remaining work force.

Additional manifestations of the progress in operating economies are to be found in the continuous improvement in the operating averages which are customarily looked upon as indices of efficiency. Railroad operating statistics year by year showed more tons per car, more cars per train, and more train-miles per train-hour, which culminated in steadily rising output of ton-miles per train-hour, the most significant over-all measurement of operating efficiency. In addition, a substantial number of old cars were replaced with new cars; modern signalling systems were installed; some outmoded and cumbersome freight classification yards were converted to more automatic and more economical operation; a good many roadways were straightened and strengthened; and diesel power all but completed the replacement of steam locomotion.

As much as this record attests to the ability and aggressiveness of modern rail management to control costs and obtain greater utilization of railroad plant, there still remains a great deal to be done to improve service and increase efficiency of operations and thus perhaps reverse the unfavorable competitive trend of the post-war period.

A BUSINESS OF MOVEMENT

As one well-known railroad officer recently pointed out, the railroad business is a business of movement, and yet its rolling stock is standing still 85% of the time despite the progress that has been made in the last ten years. Thus the rail industry continues greatly to under-utilize its roadway as well as its equipment. While this huge investment is standing idle, its ownership costs, that is, cost of money,

maintenance and depreciation, go on. And these are the elements which account for the largest proportion of the costs of running a railroad.

Furthermore, pointing to the ABC's of transportation economics, where increased utilization results in reduced operating and maintenance costs, the same officer has emphasized that in the rail industry, the principle of increased utilization has not been fully recognized, although substantial progress has been made. Viewing the many billions of dollars invested in under-utilized railroad plant, there is probably no other factor that looms as large in the industry's future efforts to reduce costs. It is an opportunity that very likely is much greater in potential importance than the total effect of dieselization.

Because railroading is essentially an engineering operation, many of the new tools of modern technology, including data processing machines, computing systems, office automation equipment of all types, and other electronic devices, can lend dynamic assistance in achieving greater utilization of plant, with consequent improvement in operating efficiency. Aside from the huge potentiality inherent in mergers and consolidations (not an unreal prospect incidentally), application of those new tools, coupled with modern transportation methods, could revolutionize the techniques of present day operations.

ELECTRONIC EQUIPMENT FOR THE RAILROADS

Research on the railroads is bringing to signalling and communications much new electronic equipment, such as

radio, industrial television, microwave, radar and all kinds of actuating devices, including those for attachment to rolling equipment to complete the cycle of automatic control. New centralized traffic control systems built on these devices can control more extensive territories automatically from simplified apparatus at a single or centralized location. Moreover, new trends toward even more compact apparatus allow CTC to be installed on thousands of miles of light density single track not now so equipped. Also, because of improvements, power switches and retarders will be justified in many smaller freight classification yards. In addition, the many interlockings on extensive terminal areas can be consolidated under one control.

When it is realized that only about 15,000 miles of single track, most of which can be classed as heavy traffic territory, have been converted to CTC in the U. S. out of a total of approximately 391,000 miles of track operated, the magnitude of the possibilities that lie in this single direction becomes obvious. Also, because there is a great deal of track duplication, further prospective economies exist in reducing track miles. In this area, an idea of the potential may be realized when it is considered that it costs about \$3,500 per annum to maintain a mile of track. The abandonment of, say, 1,000 miles of track would produce savings of \$3.5 million per year. An illustration of this point is the plan of one of the nation's largest carriers to reduce its track-miles by as much as 2,000 miles in the next three or four years, with savings estimated to run as high as \$7 million annually.

Great costs savings also await realization through con-

POST-WAR FINANCIAL RECORD — CLASS I RAILROADS

	1946	1956	% Change
Ton Miles (billions)	592	647	+ 9.
Average Revenue Per Ton Mile (cents)	0.98	1.38	+ 41
Freight Revenues (millions)	\$ 5,786	\$ 8,951	+ 55
Passenger Revenues (millions)	\$ 1,259	\$ 757	- 40
Total Operating Revenues (millions)	\$ 7,627	\$10,551	+ 38
Average No. Employees (thousands)	1,359	1,043	- 23
Average Annual Wage	\$ 3,068	\$ 5,102	+ 66
Total Wages (millions)	\$ 4,171	\$ 5,319	+ 28
Transportation Expenses (millions)	\$ 3,212	\$ 4,043	+ 26
Maintenance Expenses (millions)	\$ 2,619	\$ 3,298	+ 26
Total Operating Expenses (millions)	\$ 6,357	\$ 8,108	+ 28
Net Operating Revenues (millions)	\$ 1,269	\$ 2,443	+ 93
Income Available for Charges (millions)	\$ 756	\$ 1,291	+ 71
Total Charges - Fixed Cont. (millions)	\$ 492	\$ 113	- 16
Net Income (millions)	\$ 304	\$ 878	+ 189
Dividends (millions)	\$ 235	\$ 145	+ 89
Dow Jones Rails Earnings	\$ 5.05	\$19.52	+ 287
Dow Jones Industrial Earnings	\$13.63	\$33.34	+ 145
Dow Jones Railroad Average (Mean Price)	56.5	165.8	+ 193
Dow Jones Industrial Average (Mean Price)	187.8	491.7	+ 162
Gross Oper. Revenues Carried to Net Income	4.0%	8.3%	
Rate of Return on Capital Investment	2.1%	4.0%	

Intercity Distribution of Freight Traffic in Ton Miles
(Billions)

	1946		1956	
	Ton Miles	%	Ton Miles	%
Railroads	602.1	66.6	656.0	49.2
Motor Trucks	82.0	9.1	230.0	17.3
Inland Waterways	124.0	13.7	223.0	16.8
Oil Pipe Lines	95.7	10.6	223.0	16.7
Airways	<u>0.1</u>	—	<u>0.5</u>	—
TOTAL	903.9	100.0	1,332.5	100.0

Distribution of Ton-Miles Gain 1946-1956
(Billions)

	Gain	%
Railroads	53.9	12.6
Motor Trucks	148.0	34.6
Inland Waterways	99.0	23.1
Oil Pipe Lines	127.3	29.7
Airways	<u>0.4</u>	—
TOTAL	428.6	100.0

solidation of old and inefficient shops, yards, and terminals into strategically located plants containing the most modern facilities, including the tremendously effective up-to-date materials handling equipment. In addition, new lightweight and low-cost passenger equipment needs to be built. More specialized freight car equipment will be needed to tailor services closer to the shippers' demands. Furthermore, new service techniques to extend flexibility of transportation service such as hauling trailers on flat cars to benefit from traffic which the rails otherwise might not handle will need to be exploited to a greater extent.

In whatever direction the rail industry may turn in the years ahead for the purpose of accomplishing additional savings, there appears to be great prospect for increased control of costs. In the last analysis, the latter hold the key to successful competitive experience.

CONTROL OF EXPENSES

Moreover, as the rail industry demonstrates a greater control over expenses, the advantage of mass transportation at resultant low unit costs will be preserved. This should become increasingly apparent to the shipper, especially as spiralling costs and congestion continue to point up the poorer economics of mass movement of traffic on the high-

ways. In this regard, perhaps one of the most significant signs of the times is the increasing extent to which the rails' chief competitors, the truckers, are looking for so-called "piggy-back" assistance to help hold down costs from rising beyond the point where their currently narrow operating margins would disappear entirely.

Regardless of the hope for more modern transportation regulation and the need for statesmanlike labor management, the solution to the rail industry's improved competitive position in a sound transportation system continues to be directly related to its ability to control expenses. To the extent the rails succeed in this objective, the inherent advantage of low-cost mass transportation eventually should become a magnet for attracting additional traffic and achieving greater utilization of plant.

Furthermore, if there is sufficient cause to believe that our American economy will continue to grow in the decade ahead and the conviction is held that the rail industry will continue to make the kind of progress it has in the last ten years, then the greater demands on our transportation system, including the vital economic need for mass transportation, should be met with benefits to all—investor, labor, and the shipping public.

* * *

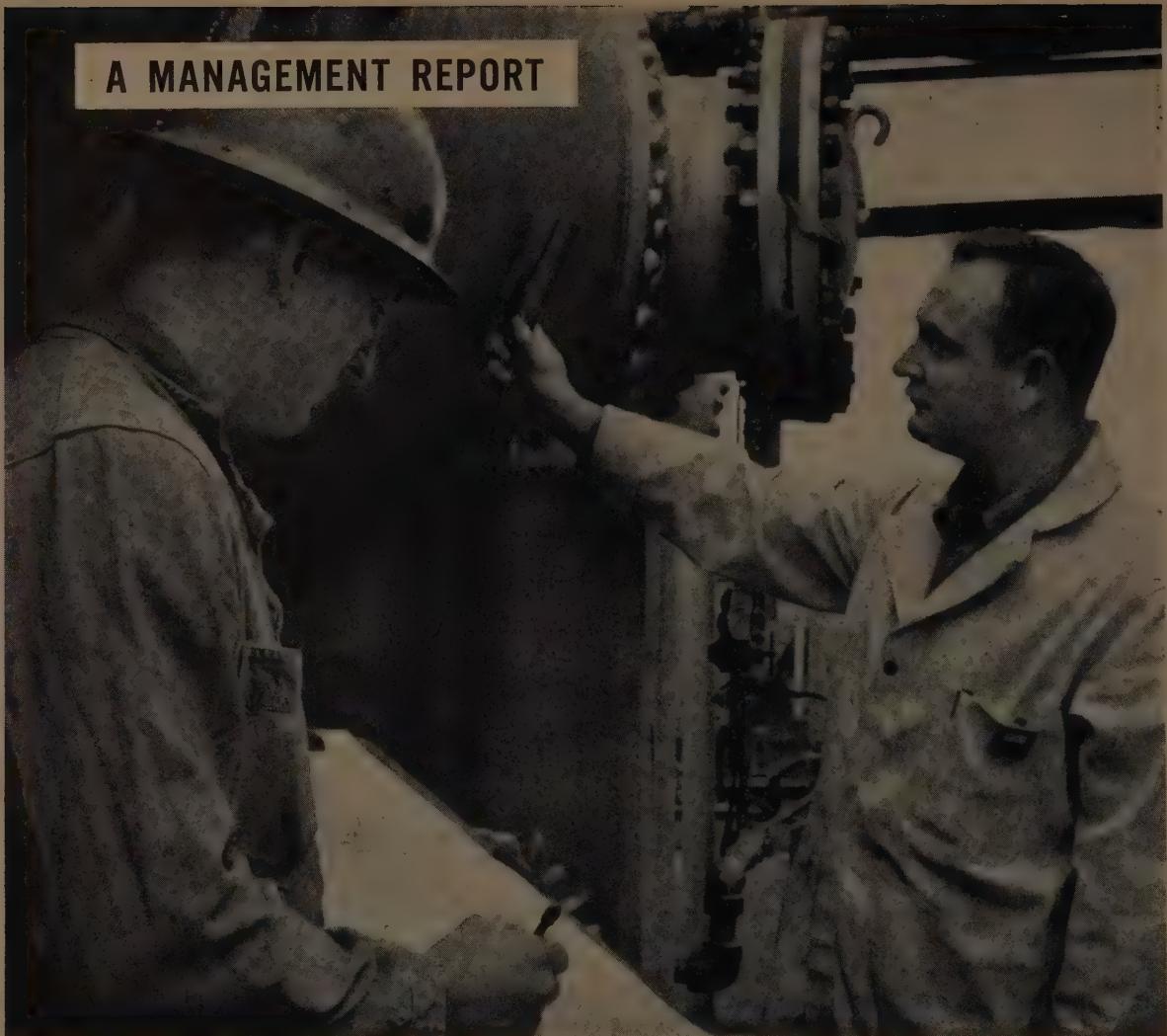
"In the railroad industry, however, net investment is not likely to change rapidly. Most of the assets consist of plant and equipment, which takes time to build and, once constructed, have long actual or potential usefulness. Most liabilities are similarly inflexible."

—Thor Hultgren

"There is a tendency on the part of the courts to put combinations of labor and of capital into the same class before the law, unless special exceptions have been made."

—Jeremiah W. Jenks, 1900

A MANAGEMENT REPORT



SINCLAIR HAS THE ATOM AT WORK



by Dr. A. I. SNOW
Senior Project Chemist
Radiation and Tracer Laboratory
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Growth Stocks — A Critical View

G. HOWARD CONKLIN

THOSE READERS WHO HAD some first-hand experience with the stock market boom which culminated in the autumn of 1929, as well as those of you who have studied that period, are aware of the psychology of the investing public at that time. Bankers, barbers, housewives, shoe-shine boys and others were gambling heavily in the stock market and had developed such an avarice for capital gains that they completely ignored the risks they were creating with their 10% margins. Furthermore, they gave no thought to the minuscule yields they were receiving from the stock they were outbidding one another to buy at fantastic price-times-earnings ratios.

During the bull market which began in 1949 and ended, or at least suffered a serious reversal, during the last half of 1957, there were many similarities and certain outstanding dissimilarities to the earlier period. There was the same disregard of the risks commensurate with low yields and extremely high price-times-earnings ratios.

During the most recent bull market, thin margins were not permitted, except in connection with rights offerings, the purchase of convertible bonds, or outright subterfuge. The really outstanding difference, however, was in the concentration of investments in "growth stocks" for long-term capital appreciation, as contrasted with the feverish in-and-out trading in investment trusts, public utility holding companies and certain market leaders which took place during the 1920s.

Throughout the present decade a large percentage of the time and effort of analysts has been concentrated on the study of hundreds of corporations in order to uncover the

small minority of issues which could qualify as "growth stocks."

ELEMENTS OF GROWTH STOCKS

"Growth stocks" in recent years have been, and in many instances still are, the fashion. The top management of almost every corporation has referred to his organization as a "growth situation," hoping that the label would stick. In the minds of the investing public, a "growth stock" is a common stock which has recorded, or gives promise of recording, a greater than average appreciation in market price over a span of several years. Some investors have been of the opinion that the stock of almost any representative company in the chemical, electronic, air conditioning, office equipment or paper industry should be called a "growth stock." Professional investors, however, have discovered that there must be certain fundamental elements within a corporation to enable its stock to out-perform the stock market averages. Several of these basic factors are given below:

1. A record of more than average increases in sales and earnings over a period of years.
2. A large plow-back of earnings into additional plant and equipment.
3. A sizable percentage of sales spent each year on research.
4. A high return on invested capital.
5. A record of introducing a series of new products for which profitable and expanding markets have developed.
6. A superior "growth-minded" management, and preferably management in depth.

TABLE I

	Highest Closing Price 1950	All-Time High	Year of Peak	% Market Appreciation
Alcoa	18 3/4	133 1/2	1956	612
Aluminium Ltd.	16 3/8	53 1/8	1957	224
Amerada	40 7/8	147 1/2	1957	260
Corning Glass	18 1/8	106 1/4	1957	486
Dow Chemical	27 3/4	82 7/8	1956	197
DuPont	85 3/8	249 3/4	1955	192
General Electric	16 7/8	72 3/8	1957	328
Int'l Business Machines	76 3/4	376 1/2	1957	390
Int'l Paper	47 7/8	144 1/2	1956	201
Minneapolis-Honeywell	21 1/4	131	1957	516
Minnesota Mining & Mfg.	18 7/8	101	1957	435
Nat'l Cash Register	13 1/8	70 5/8	1957	438
Nat'l Lead	23 1/4	138	1957	493
Scott Paper	25	78 3/4	1955	215
Union Carbide	55 3/4	133 3/8	1956	139
Dow-Jones Industrial Average	235.5	521.1	1956	121

Above have been adjusted for all stock splits and major stock dividends

7. A producer of products which require tremendous amounts of capital in order to construct minimum production facilities.

8. A monopolistic position due to know-how, basic patents, strategic geographical locations and/or lowest cost natural resources.

Probably many analysts will take exception to one or more of the above factors, or they may enumerate several others which have not been included. This is a common experience with "growth stocks." Depending on which yardsticks are used, various companies are considered as qualifying or not qualifying as "growth" situations. Differences of opinion will occur also with respect to the 15 "growth stocks" shown in Table I, but it is believed that most analysts will agree that at least the majority of them are popularly considered as "growth stocks."

Table I lists the highest closing price in 1950 for each of the 15 issues. It also shows the all-time high market closing price to date for each. Column No. 3 indicates the calendar year in which the all-time high occurred. Column No. 4 shows the percentage appreciation from the 1950 high to the all-time high for each of the 15 stocks included in the table.

It should be noted that the use of "peak" prices and "all-time high" earnings refers to the maximums which have occurred prior to December 31, 1957, and does not refer to future earnings or prices.

A glance at column number 4 shows that those who pur-

chased and held any or all of these "growth stocks" in the year 1950 were amply rewarded. Aluminum Company of America (Alcoa) showed the greatest increase in market price, with its 1956 highest closing price of 133½, just 612% above its 1950 highest closing price. Even the poorest performer, Union Carbide, appreciated in value by 139%, or more than the Dow Jones Industrial Average, which went up 121% from its highest closing level in 1950 to its all-time high closing price, which occurred in 1956. This is truly a remarkable performance. The question naturally arises, however, as to how long this can continue. In an effort to uncover certain underlying weaknesses in "growth stocks," Table II is submitted below.

Column No. 1 shows the 1950 earnings per share for each of the 15 companies. Column No. 3 lists the all-time highest annual earnings to date. If estimates for 1957 indicated higher earnings than for any preceding year, then 1957 estimated earnings are used. It is interesting to note that only 5 of the 15 companies are expected to report higher earnings in 1957 than in any prior year. Column No. 4 lists the percentage increase in per share earnings from 1950 to the peak level (occurring in either 1955, 1956 or 1957). Column No. 5 repeats column No. 4 of Table I for purposes of comparison.

If column No. 4 of Table II is compared with column No. 5, certain maladjustments become obvious. For example, International Paper Company common stock advanced 201% from its 1950 closing high to its closing high in 1956. Earnings per share, however, advanced only 16%

TABLE II

	Earnings Per Share 1950	Year of Peak Earnings	Peak Earnings Per Share	% Earnings Gain	% Mkt. Price 1950 to Peak Level
Alcoa	\$2.27	1956	\$4.24	86	612
Aluminium Ltd.	1.56	1956	1.85	18	224
Amerada	2.44	1957	e4.60	88	260
Corning Glass	*3.19	1955	*3.56	11	486
Dow Chemical (a)	1.78	1956	2.52	41	197
DuPont	6.59	1955	9.26	40	192
General Electric	2.00	1957	e2.90	45	328
Int'l Business Machines	**3.17	1957	e**9.70	206	390
International Paper	6.71	1955	7.81	16	201
Minneapolis-Honeywell	2.39	1956	3.40	42	516
Minnesota Mining & Mfg.	1.26	1957	e2.55	102	435
Nat'l Cash Register	1.85	1957	e2.75	48	438
National Lead	2.41	1956	5.34	80	493
Scott Paper	1.95	1956	2.78	42	215
Union Carbide	4.30	1955-6	4.86	13	139
Dow-Jones Industrial Average	30.70	1957	e36.75	19	121

e = Estimate

* = Including equity in undistributed earnings of Dow-Corning Corp., Owens-Corning Fiberglas Corp., and Pittsburgh-Corning Corp., but excluding earnings of foreign subsidiaries.

** = Including all foreign earnings on a consolidated basis.

(a) Fiscal year ended May 31.

TABLE III

Market	% Decline	Esti- mated	1957	Price-Times-Earnings Ratios		
				12/27/57	All-Time Peak	1950 Peak
Alcoa	60 3/4	54.5	\$3.75	16.2	8.2	31.4
Aluminum, Ltd.	28 1/8	47.0	1.50	18.7	11.2	28.7
Amerada	91	38.3	4.60	19.7	16.7	32.0
Corning Glass	83 3/8	21.5	3.26	25.5	5.6	29.8
Dow Chemical	52 1/2	36.6	2.20	23.8	15.6	32.8
DuPont	177	29.1	8.55	20.7	12.9	26.9
General Electric	59 5/8	17.6	2.90	20.5	8.4	24.9
Int'l Business Machines	302 3/8	19.7	9.70	31.1	24.2	38.8
International Paper	88 3/4	38.5	5.80	15.3	7.1	18.5
Minneapolis-Honeywell	82 1/2	37.0	3.35	24.6	8.8	38.5
Minnesota Mining & Mfg.	77 7/8	22.8	2.55	30.5	14.9	39.6
Nat'l Cash Register	50 5/8	28.3	2.75	18.4	7.0	25.6
National Lead	97 1/4	29.5	5.10	19.0	9.6	25.8
Scott Paper	58 3/8	25.8	2.70	21.6	12.8	28.3
Union Carbide	94	29.5	4.80	19.5	12.9	27.4
Dow-Jones Industrial Average	432.9	16.9	36.75	11.7	7.6	14.1

from 1950 to the peak to date, which occurred in 1955. Corning Glass Works reported an even less satisfactory relationship between market appreciation and increased earnings.

In contrast, the market price of International Business Machines advanced 390%, but its earnings per share increased 206%. This is the most conservative relationship in the entire list. All the other stocks fall between these extremes. Even the Dow Jones Industrial Average worked itself into a vulnerable position, as evidenced by the fact that earnings from 1950 through 1957 went up only about 19% (on an estimated 1957 earnings basis) but the market price from the high of 1950 to the high of 1957 skyrocketed by 121%.

PRICE-TIMES-EARNINGS RATIOS

The next logical step is to compare the price-times-earnings ratios of these same stocks in 1950 and in their peak years. This is shown in column No. 5 and column No. 6 of Table III.

From the above table it can be seen that the price-times-earnings ratio of the Dow-Jones Industrial Average was 7.6 in 1950 (using the 1950 highest closing price and earnings figure for calendar year 1950). The price-times-earnings ratio for maximum purposes (using the highest closing price in 1956 and the earnings estimate for 1957) was 14.1. In other words, the price-times-earnings ratio almost doubled.

As an individual example, the price-times-earnings ratio of Minneapolis-Honeywell Regulator jumped from 8.8 times in 1950 to 38.5, or over four times the 1950 ratio. (Based on highest closing price in 1950 and the 1950 per share earnings, contrasted with 1956 highest closing price and 1956 per share earnings.) Other extreme and less extreme examples can easily be found by comparing the other items in column No. 5 with the corresponding figures in column No. 6.

RISKS INVOLVED IN PROLONGED HOLDING OF GROWTH STOCKS

1. If, over a period of years, the market price goes up several times faster than the earnings increase, "growth stocks" become extremely vulnerable, marketwise. When the inevitable decline does take place, it should be expected to be much more severe than the decline in the Dow-Jones Industrial Average. This is evidenced by Amerada, which declined 38.3% in price from its peak to the closing on December 27, 1957 (see column No. 2, Table III). Also see Minneapolis-Honeywell, National Cash Register and Scott Paper.

2. Once earnings turn downward, the magic of the label "growth stock" disappears and its price is subjected to a double-barrelled decline—not only does the market drop in relation to the decline in earnings, but the drop in price is accelerated by lower and lower price-times-earnings ratios as confidence fades. A good example of this is Alcoa. The market price went up 612% from 1950 to 1956 while per share earnings increased 86%. Once the industry entered a phase of over-capacity, which first became apparent about the middle of 1956, and a decline in earning power appeared in subsequent quarterly reports, the price of the stock dropped precipitously. By December 27, 1957, it had declined 54.5% in price, as contrasted with a 16.9% decline in the Dow Jones Industrial Average. (See column No. 2, Table III.) Other examples of this type are Aluminum, Ltd., International Paper, Dow Chemical, DuPont, Union Carbide and National Lead.

3. If after a reasonable length of time the anticipated increase in earnings fails to materialize, even though the market price has moved up sharply, the continued holding of such a "growth stock" involves a high degree of risk. For example, Corning Glass Works has almost all of the elements of a "growth stock," such as a growth-minded management, large expenditures on research, the develop-

ment of many new and glamorous products, for which expanding markets have been found, but an important increase in per share earnings has failed to develop during the past seven years. (See Corning Glass on Table II and Table III.)

CONCLUSION

"Growth stocks" have appreciated in market price more than the average stock over the past seven years, as illustrated by the examples given above.

The theory that "growth stocks" should be constantly accumulated but never sold has been largely discredited by the recent performance of the 15 stocks included in this report. Each of them has already declined more than the Dow-Jones Industrial Average and several have dropped two to more than three times as much, percentagewise.

The stock market itself is in the process of deglamorizing "growth stocks."

VIGILANT APPRAISALS OF GROWTH STOCK

In summation, a "growth stock" should be regarded as more attractive than the average stock only when its market price is in line with its fundamental value. Actually a "growth stock" is much less attractive than the average investment type stock when its price-times-earnings ratio is in adverse relationship to that of the Dow-Jones Industrial Average. In other words, "growth stocks" require the same constant vigilance as any other type of investment. When they are cheap in relation to fundamentals, they should be bought. Conversely, when they are selling at levels which cannot be justified by earnings and dividends, they should be sold.



Southern California Edison Company

DIVIDENDS

The Board of Directors has authorized the payment of the following quarterly dividends:

CUMULATIVE PREFERRED STOCK.
4.08% SERIES
Dividend No. 32
25½ cents per share;

CUMULATIVE PREFERRED STOCK.
4.24% SERIES
Dividend No. 9
26½ cents per share;

CUMULATIVE PREFERRED STOCK.
4.88% SERIES
Dividend No. 41
30½ cents per share.

The above dividends are payable February 28, 1958, to stockholders of record February 5. Checks will be mailed from the Company's office in Los Angeles, February 28.

P. C. HALE, Treasurer

January 16, 1958

Edison



GOOD YEAR

DIVIDEND NOTICE

The Board of Directors today declared the following dividend:

60 cents per share on the Common Stock, payable March 15, 1958 to stockholders of record at the close of business February 17, 1958

The Goodyear Tire & Rubber Co
By Arden E. Firestone,
Secretary

January 13, 1958

THE GREATEST NAME IN RUBBER



**AMERICAN ENCAUSTIC
TILING COMPANY, INC.**

*Manufacturers of Ceramic
Wall and Floor Tile*

COMMON STOCK DIVIDEND

Declared January 15, 1958
15 cents per share
Payable February 28, 1958
Record Date February 14, 1958

America's Oldest Name in Tile



**TEXAS
EASTERN**

**DIVIDEND
NOTICE**

JANUARY 29, 1958

The Board of Directors of the Company has declared the following quarterly dividends, all payable on March 1, 1958, to stockholders of record at the close of business February 7, 1958.

COMMON STOCK \$0.35
PREFERRED STOCK
5.50% First Preferred Series \$1.37½
5.85% Series \$1.46½
5.00% Series \$1.25
4.75% Convertible Series \$1.18¾
4.50% Convertible Series \$1.12½
5.75% Subordinate
Convertible Series \$1.43¾
6.70% Series \$1.87972*

*Accrued from date of issue, 11-20-57.

John J. Hayes
Secretary

TEXAS EASTERN
Transmission  Corporation
SHREVEPORT LOUISIANA

NATURAL GAS: Processing and Transmission
OIL AND GAS: Exploration and Production
OIL PRODUCTS: Refining and Transmission

Selecting Investments for 1958

N. LEONARD JARVIS

MOST SECURITY ANALYSTS agree with a statement made at the turn of the century by J. P. Morgan, who, when asked his opinion of the market, assured one and all "it will continue to fluctuate." This frequently happens to the individual issues we pick. In today's market it appears all of them are vulnerable to fluctuations, although fortunately for us these upward and downward movements until recently have not been as violent as those experienced in Mr. Morgan's day.

Recognizing that there is some measure of speculation in any issues we may select—even though the speculation, if we are lucky, may relate only to the timing of purchase or sale—all agree with that dean of investors, Bernard M. Baruch, who offered the rule we live by. As most of you have probably read by now, he has warned time and again: "Never become involved in a speculative venture until you have mastered all the facts about it." As he explains it: "Successful speculation demands not only courage, persistence and a judgment unclouded by emotion, but above all things it requires an infinite capacity for taking pains to analyze all available facts."

Facts—thanks to the SEC—are available. Yet one of the fascinating aspects of our business is the wide divergence of conclusions top-flight analysts may reach even when operating in an identical economic climate and with the same basic materials at hand.

THE CHARTISTS

Some analysts are chartists. Watching the stock indices closely—generally using either the Dow-Jones indices or those of Standard & Poor's—the chartists depend upon the past action of stock prices for gauging future moves. Chartists look for varied formations according to specific theories to offer them their clues for action. Some chartists go beyond mere graphic formations and relate such factors as volume, earnings and dividends, returns on alternate investments; that is, common stocks versus bond yields, to current prices. Depending upon whether he decides certain issues appear undervalued or overvalued, the chartist sends out his buy or sell signal. Occasionally the chartist may not even take the time to probe why a certain issue looks cheap in relation to the market, or undervalued by comparison with other stocks in the same industry group, or, conversely, why another issue may appear overvalued, before reaching his buy or sell conclusion. Other chartists use their extensive tabulations as a point of departure and launch out into the field to see at first hand why a particular issue is behaving the way it is.

Field research is becoming an increasingly important part of the work of the security analyst. This is where he meets management face to face and is granted a first-hand opportunity of appraising the men who run important corporations. One distinguished analyst, who if queried on whether General Electric or Westinghouse is the better

buy, is likely to favor General Electric on the basis of management. There have been periods in the past when one or the other of these issues may have offered the better opportunity for a shorter term gain, and no doubt such occasions will arise in the future. Regardless of whether the Dow-Jones industrial averages hover in the low 390's or break through the 500 barrier, a good analyst usually buys only common stocks of growth companies with exceptionally able managements and a policy of plowing back earnings. Then one can hold fast through good times and bad.

THE WEIGHT OF PAST PERFORMANCE

There are analysts who stress past performance of a company. They want to see a nice straight curve of rising volume, increased earnings, growing dividends over a representative period of years. These are the analysts who often shy away from merger situations in their earlier years, claiming they would rather sit it out and see how these companies will weather an economic storm, and see whether it blows over an individual industry or over the economy as a whole. I cannot fully agree with this school of thought. It is more satisfactory to apply the greater portion of research toward detecting what the future may hold for a specific issue. This route frequently takes one through thorny technological paths. Yet the future belongs to those companies which are spending heavily for research and are mustering the resources and talent for innovations that will make the world of tomorrow a better place to live in.

None of us can take credit for always picking our issues independently. We do not even try. There is no magic to selecting stocks, nor is there any set formula. One often begins by latching onto knowledge of current events in the broadest sense. The XYZ Company represents the ABC Industry. How is this industry being affected by developments on the international scene? If it is a defense industry stock, what measures are pending abroad—or in Washington—that could in one way or another be reflected in the performance of this issue? If there is no international angle, how might national affairs affect it? For instance, could this issue be a victim—or a beneficiary—of the Federal Reserve's money policy? Is there a geographic angle; or is this industry subject to any Federal, State or local controls? Both of these factors, for example, enter the appraisal of a utility. Is the industry represented a cyclical one? If so, where in the economic cycle does it stand today? What may befall it tomorrow? How vulnerable could this situation be to the whims of consumer demand? What of the future of the industry technologically; and how about the ability of the XYZ Company on a scientific basis to advance further than other companies in the same industry? Is it dependent upon other industries as a coal hauling rail might be? Above all, how does this particular company stand in relation to others in the

same industry? What portion of the industry could it dominate? What indications are there that its importance may increase; that it may outpace its competitors? What is its labor factor? How is the inventory status, price firmness of the product, and the trend of profit margins?

It becomes evident that after such preliminary questions it is time to delve into the company's past. If the past looks good, then a thorough appraisal of the future might well be warranted. Here you have an interplay of what analysts these days are calling quantitative and qualitative analysis. I would like to offer a concrete example in order to make my point:

The major drug companies offer endless possibilities. They have in the past. Last summer an obvious question was, "Who will stand to profit the most from the Asian flu vaccine?" It was a simple matter—public information on the front pages of the financial press daily—to determine how many cc's each company planned to manufacture. By analyzing this output dollar-and-cents-wise, it became evident that Allied Laboratories of Kansas City stood to make considerably more from this product than some of its more diversified competitors—that is, on a per-share basis.

Sometimes a well-timed question, during the course of a routine check with a well-considered company, will do the trick. I will admit to sheer luck, too. When U. S. Vitamin was selling at 14, I queried management regarding new products and was among the first to learn of the company's oral diabetic drug to be substituted for the usual insulin treatment. Subsequent to the announcement of this development U. S. Vitamin rose to 46.

Often hard work gets results. A visit to the Schering plant revealed important prospects. Earning \$1.00, Schering then sold at 18, and on the basis of management and statistics the issue was already attractive. At the plant I learned of the company's newest development, a prednisolone drug called Meticortelone, which, it had been proven, did wonders for arthritic sufferers, of whom there are thousands. I put Schering on my "buy list." The market cooperated and in a couple of years Schering was selling at 96, thanks in part to Revlon.

INVESTMENT STATUS

It is important to act on your convictions when you get advance information, provided the price is right. It is just as important to remember that sometimes, after an announcement, the development may have become obsolete, as in the case of an airplane. If you know a company is to be listed, that is often worth several points. Once listed, a company may be sold "down the river" by the speculators unless its "true values" have not been over-discounted. Over a period of time, however, listed securities improve their marketability and consequently their investment status.

By now you are probably wondering why someone did not advise you to pick one or another of the issues I have just mentioned as examples. The answer is simple. While I—along with my colleagues—constantly track down "new situations," and this does not necessarily mean new issues or new companies, these "new situations" for one reason or another may not suit your investment needs. While

security analysts have been dubbed wholesalers and sometimes retailers of financial intelligence, still each one of us renders a very personal service. Just as your physician is not going to prescribe the latest tranquilizer for you, just because he is excited about it, if you are suffering a bacterial infection that can be cured by an anti-biotic. The same principle applies to picking stocks for a client. If my customer is seeking income, IBM is no good for him, although for someone looking to future growth this issue bought on the right day could be a splendid vehicle, unless it has reached a temporary saturation point.

There is also a right day for selling. Lots of antiques like furniture or jewelry gain in value with time. Other antiques deteriorate, such as a growth issue that has simply stopped growing, perhaps due to new competition or excess capacity. A great many people who refused to sell certain issues at the recent highs are regretting it today, as you well know, but place the blame on our questionable capital gains tax. For successful advice one must know the needs of each investor, but to all an appraisal of the entire market outlook is desirable.

OPPORTUNITY AND THE POPULATION GROWTH

Certain industries seem to carry greater opportunities for profit than do others. One such may be the cigarette issues. On the basis of population growth and on the strength of management, they are showing good earnings. Another could be the glass industry. Again reflecting population growth, rising income and new or expanded uses, the glass industry has grown at an annual rate of slightly over 5 per cent since 1929. Glass container manufacturers have upped shipments to the drug industry alone by 54% since 1947; sales to food processors are up 52% in this period and now account for nearly 40% of total sales. The average new automobile contains 50% more glass area than its 1940 counterpart. The average home built today uses 36% more glass in relation to floor area than was the case ten years ago, and research is finding new uses.

The food chains are doing a magnificent job of retailing. They are commanding the latest in inventory control, warehousing, store display, self-service techniques in order to cut their costs. They are stopping at nothing to capitalize on growing traffic by better store locations, profiting vastly from the development of suburban shopping centers, and by stepping beyond their traditional lines of merchandise to offer the homemaker a vast assortment of items formerly found only in drug or variety chains.

In a market of the sort we have today many a fine utility offers a relatively safe 5 1/2% to 6% yield, and I do not think that this group will be too adversely affected by higher interest rates should we see even tighter money in the next year or two. A 10% rate increase usually pushes earnings on the common up about 33%; a 6% increase nets about 20% higher earnings. These higher earnings invariably are passed along to stockholders in the form of higher dividends. These percentages, of course, are effective only if costs are stabilized, and no dilution is necessary.

Consumable items such as soaps and drugs are attractive. As a nation we are constantly becoming more health con-

scious. We have more babies in our land each year and more of them get vitamins. We are also a nation of more older people, and many of them are having their ills eased, their life prolonged by drugs unknown five or even two years ago.

There may be undervalued issues among the makers of building materials, and even though new construction, residential and industrial, may not gain as rapidly in the near-term future as it did in the recent past, the renovation market is an important factor and oftentimes during periods of slowdowns in new building registers a sharp pickup.

The market is fickle, as a woman is sometimes, and exactly as fashion conscious. Back in 1928 and 1929 it was the fire insurance issues that were in vogue. Three or four years back it was the life insurance companies and life insurance mutual funds were formed. After that the Canadian oils came in for a play. The aircrafts and the airlines were once the rage and scored fantastic gains. We have had our "paper" year and our machine-tool year, and office equipment issues have been in the recent limelight, with the promise of a repeat performance some day. One year we had uranium and atomic energy, and now many are asking whether the atomic energy bubble has burst.

As a result of the second Russian satellite it is obvious that our national program will have to be revised. In the first place, money which has been set aside for missile research has been provided for at the expense of aircraft production. Secondly, the bulk of missile expenditures has

been for research development and testing rather than for production. It appears that we may soon enter into the missile production fields as well, which means that companies such as Martin, Douglas, Boeing and North American may come in for consideration—North American for missile engines and if the Ramjet-powered Navajo missile is restored to the Government's program.

For the present, we must be careful with this market. Some over-all decline in profit margins can be expected. Large capital outlays have increased capacities, with the result that business is more competitive in many fields. Many new plants have been constructed during the past year or two, and with the new setup it will be very difficult to ascertain how much companies can cut costs under the more competitive conditions indicated, and this surely will vary with companies in various industries.

The international situation is also something to consider. The Russian satellites have certainly called us for "margin" and this will very likely put the bite on the Treasury. The long-term effect of wars and extraordinary defense spending has always been inflationary after frightened selling. How far can we trust world leaders who begin their dinners with 21 vodka martinis?

Whatever we like, we will not be 100% accurate. We do have something to think about—1958 looks like a suspect year. It will try us for all we are worth, not only as analysts, but as psychologists, military armchair strategists, securiticians, and technacycists!

American Metal Climax, Inc.

COMMON STOCK
Dividend No. 129

The Board of Directors has declared a dividend of Thirty cents (30¢) per share on the Common Stock payable March 1, 1958 to stockholders of record at the close of business on February 19, 1958.

D. J. DONAHUE,
Treasurer.

AIR REDUCTION Company Incorporated

 163rd CONSECUTIVE
COMMON STOCK DIVIDEND

The Board of Directors has declared a regular quarterly dividend of 62 1/2¢ per share on the Common Stock of the Company, payable on March 5, 1958 to holders of record on February 18, 1958, and the twenty-fifth regular quarterly dividend of \$1.125 per share on the 4.50% Cumulative Preferred Stock, 1951 Series, of the Company, payable on March 5, 1958 to holders of record on February 18, 1958.

January 22, 1958

T. S. O'BRIEN, Secretary



THE DAYTON POWER AND LIGHT COMPANY

DAYTON, OHIO

142nd Common Dividend

The Board of Directors has declared a regular quarterly dividend of 60¢ per share on the Common Stock of the Company, payable on March 1, 1958 to stockholders of record at the close of business on February 17, 1958.

GEORGE SELLERS, Secretary
February 7, 1958

FEDERAL

FEDERAL PAPER BOARD CO., Inc.

Common & Preferred Dividends

The Board of Directors of Federal Paper Board Company, Inc. has this day, declared the following quarterly dividends:

50¢ per share on Common Stock.
28 3/4¢ per share on the 4.6% Cumulative Preferred Stock.

Common stock dividends are payable January 15, 1958 to stockholders of record at the close of business December 27, 1957.

Dividends on the 4.6% Cumulative \$25 par value Preferred Stock are payable March 15, 1958 to stockholders of record February 27, 1958.

ROBERT A. WALLACE
Vice President and Secretary

December 6, 1957
Bogota, New Jersey

PUGET SOUND POWER & LIGHT COMPANY

Common Stock Dividend
No. 58

The Board of Directors has declared a dividend of 34¢ per share on Common Stock of Puget Sound Power & Light Company, payable February 15, 1958, to stockholders of record at the close of business January 27, 1958.

FRANK McLAUGHLIN
President

MINNEAPOLIS GAS COMPANY

739 Marquette Avenue
Minneapolis 2, Minnesota

Common Stock Dividend

The Board of Directors of Minneapolis Gas Company, at a meeting held on January 2, 1958, declared a dividend of 36 1/4 cents per share payable in cash on February 10, 1958, to common stockholders of record as of the close of business January 23, 1958.

G. T. MULLIN, President



ARMCO First in flying steels

Thousands of tons of Armco precipitation-hardening Stainless Steels have been used in the nation's finest military aircraft, the F-86, F-100, F-102A, F-104, and the world's fastest bomber, the B-58 Hustler.

Now, a new aircraft steel, Armco PH 15-7 Mo Stainless Steel, is ready and waiting for the air weapons of tomorrow. It will protect planes and missiles from the scorching heat of air friction at terrific speeds. Such a steel is vital to the air capabilities of the nation.

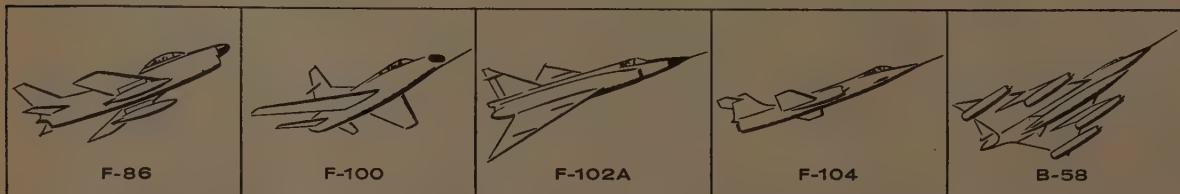
Today the aircraft and missile industry is the second largest user of stainless steel. Armco has served, and will continue to serve, this rapidly growing market with new and improved steels that will do the tasks demanded of them. Supplying special steels like these—to enable *all* industry to produce better products—has been the basis of Armco's steady growth for more than half a century. Today, the steels of tomorrow are being produced at Armco.

ARMCO STEEL CORPORATION

MIDDLETOWN, OHIO



SHEFFIELD DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION



Foundations of Security Analysis

EDWARD F. RENSHAW

IN HIS BOOK, *The Scope and Method of Political Economy*, John Neville Keynes distinguishes between "a positive science . . . a body of systematized knowledge concerning what is; a normative or regulative science . . . a body of systematized knowledge discussing criteria of what ought to be; and an art . . . a system of rules for the attainment of a given end," and comments that, "confusion between them is common and has been the source of many mischievous errors.

An examination of the voluminous literature that has been written on the subject of stock market behavior indicates that "security analysis," as distinct from "market analysis," is largely a normative science; it is concerned primarily with the problem of determining the "true or intrinsic" value of securities. According to its leading proponents, Graham and Dodd, the security analyst should only be concerned with those fluctuations in security prices which create opportunities to buy at less than the "true" value and to sell at more than such value.

Market analysis, on the other hand, is largely a positive science; it is concerned with the identification of trends and relationships which are internal to the market itself and can be used to forecast the direction of price movements.

The limitations of both approaches to the over-all problem of investment decision has been clearly recognized. While in the long run average prices probably do not deviate far from true investment values, it is nevertheless a disturbing fact that "undervalued" securities can remain undervalued for uncomfortably long periods of time and "overvalued" securities can become even more overvalued. As Graham and Dodd have pointed out:

"In actual practice the selection of suitable buying and selling levels becomes a difficult matter. Taking the long market cycle of 1921-33, an investor might well have sold out at the end of 1925 and remained out of the market in 1926-30 and bought again in the depression year of 1931. The first of these moves would later have seemed a bad mistake of judgment, and the last would have had most disturbing consequences. In other market cycles of lesser amplitude such serious miscalculations are not so likely to occur, but there is always a good deal of doubt with regard to the correct time for applying the simple principle of 'buy low and sell high'."

On the other hand, it can be demonstrated, on paper at least, that while any number of forecasting systems would have worked well during certain periods in the past, it is generally possible to find periods in which each system would not have functioned satisfactorily. The Cowles Commission's studies and others have demonstrated that stock market forecasters have been rather unsuccessful at forecasting. Indeed, since to be correct in forecasting a substantial change in price implies that the general market

has made an error in buying and selling at existing prices, a serious question can be raised as to whether it is reasonable to expect forecasting to ever be generally successful.

These words of caution are not meant to be disparaging of either approach to investments. At least to the non-extremists, both approaches have a certain relevance—security analysis as a guide to the selection of the best buys, and market analysis as a guide to the most appropriate timing. At this stage in the development of security analysis and market analysis, however, one is almost forced to conclude that both approaches are in practice largely arts; the science of either, as denoted by the existence of a large body of systematized knowledge, is relatively undeveloped. It is to the task of assembling such a body of knowledge with respect to security analysis that this paper is addressed.

A CASE FOR DEVELOPING THE SCIENCE OF SECURITY ANALYSIS

The study of what would or "ought" to occur in a rational economy has more importance for him who would understand in order that he might change and improve the "rules of the game" than for him who merely desires to win under the existing rules. The normative aspects of security analysis have much greater appeal to the reformer than to the speculator. It would be absurd for the individual speculator to base his operations naively on an attempted analysis of how the social present should be adjusted to the social future; he would stand to lose his shirt if the market did not eventually adjust to the future in the way he predicted that it "ought" to.

From the standpoint of the average investor and the security market as a whole, however, there is a strong case for systematically developing the normative aspects of security analysis; the hope is that by rigorously defining and publicizing intrinsic values, irrational deviations between what is and ought to be with respect to the level of security prices will be minimized. Since intrinsic values are inherently more stable than actual market prices, a minimizing of the variance of actual prices around intrinsic values would result in increased price stability.

The social value of greater price stability in the security market practically goes without saying. Fluctuations in security prices that are unrelated to the economic fortunes of the business which they represent or the substitution possibilities which exist in other investment markets, narrow the market for securities by increasing unnecessarily the risk of committing funds to it. The supply of risk capital is consequently restricted. Fortunes are made and lost without sufficient economic cause, and the market place loses its respect as a necessary intermediary between saving and investing in a complex society. Johnson, in commenting on the problem of unstable agricultural prices, has noted:

"The effectiveness of prices as directives in inducing appropriate allocation of resources is greatly impaired by violent fluctuations in prices and incomes such as those experienced in the interwar period."

His observation is not without relevance to the security markets. One has merely to look at the extent to which the Federal Government is and has been involved in the direct stabilization of other markets to obtain an inkling of a social desire for greater price stability.

If the irrationality of past disturbances is not to contain the seeds of similar disturbances in the security market of the future, it would seem imperative that objective standards be formulated and agreed upon for determining the intrinsic value of securities, individually and collectively, and further that these values be made widely known to the public at regular intervals so that investors and speculators, who have neither the time nor the technical training and equipment for making highly complex valuation studies, may have a firmer bench mark upon which to gauge their purchases and sales.

In the words of Frederick Macaulay, "The chief reason for the deviations of the actual from the 'rational' is the inability of human beings to foresee the future, let alone adjust the present to it. . . . To the extent that the future can be foreseen it can be prepared for." The science of security analysis, as envisaged herein, would entail making the best possible use of historical information so that it may aid us in peering into the future. Again quoting Frederick Macaulay:

"Lack of knowledge of the future is a fundamentally disturbing factor but the effects of inability to handle logically the facts of the present must not be underestimated. Indeed, if that inability were less, our knowledge of the future would be greater."

It is to the task of assembling and utilizing the information at our disposal, so that we may better understand not only how the market has behaved in the past but how it ought to behave in the present in order to prevent unnecessary adjustments in the future, that this article is directed.

THE CONCEPT OF CENTRAL VALUE

"The most important single factor determining value is now held to be the indicated average future earning power. Intrinsic value would then be found by first estimating this earning power and then multiplying the estimate by an appropriate 'capitalization factor'."

As Graham and Dodd have suggested, the problem of determining intrinsic or central value can be broken down into two distinct aspects, estimation of average future earning power and finding a suitable capitalization factor. Except for relatively new businesses which have no established earning power and businesses which on other grounds are expected to have a radical change in fortune, it is pretty well agreed that the best estimate of future earnings is some weighted function of past earnings. If transitory factors which cause unusually high or low earnings in any one year are to be partially balanced out or eliminated, it is necessary to attach weight to earnings which have

accrued in more than one year. At the present time there does not seem to be agreement as to the kind of weighting system that should be used: should estimates of future average earning power entail the use of a ten-year moving average, a five-year moving average, a system of declining weights, or a set of weights modified by a trend factor? Choice of a weighting system, however, is not a crucial matter as far as the over-all analysis of central value is concerned; from a statistical point of view, the best set of weights can be found as an incidental matter to the process of determining capitalization factors.

The most crucial aspect of central value is the determination of suitable "capitalization factors." Another way of looking at the same thing is to ask what are the determinants of an appropriate price-earnings ratio as distinct from actual price-earnings ratios that can be computed directly from current prices and earnings. One of the greatest weaknesses of security analysis at the present time is the off-hand and unreasoned manner in which capitalization factors are obtained. In valuing the Dow Jones industrial average, Graham arbitrarily assumes that the appropriate capitalization factor can be taken as the reciprocal of twice the interest rate on Moody's all corporation AAA bonds. In the second edition of *The Intelligent Investor*, he comments:

"The multiplier should reflect prospective longer-term changes in earnings. A multiplier of 12 is suitable for stocks with neutral prospects. Increases or decreases from this figure must depend on the judgment and preferences of the appraiser. In all but the most exceptional cases, however, the maximum multiplier should be 20 and the minimum should be 8."

As opposed to an approach to the determination of capitalization factors which is either very arbitrary or largely objective, the view that will be taken by this analyst is that capitalization factors should be obtained by relating multipliers observed in the market to plausible economic variables. In this manner behavior in the stock market over long periods of time can be used to obtain capitalization factors. This approach to the problem is not at all out of line with what might be regarded as the underlying assumption implicit in security analysis:

"This field of analytical work may be said to rest upon a twofold assumption: first, that the market price is frequently out of line with the true value; and, second, that there is an inherent tendency for these disparities to correct themselves." (Graham and Dodd.)

"Prices and values cannot indefinitely move in opposite directions. It can be demonstrated statistically that over reasonably long periods average prices do not deviate far from the true investment values. If a coefficient of correlation between them was computed, it would probably be very high." (Nicholas Molodovsky.)

Critics of security analysis have been prone to point out that the "intrinsic value suffers from an inedquate formulation of its own central concept and, therefore, cannot be accepted for precise, unambiguous scientific use." According to Pickett and Ketchum:

"The 'true' or intrinsic value of a share of stock is a much more intangible concept. The par, book, and market values can be obtained from published data relating to the corporation, and these amounts are definite. The intrinsic value, on the other hand, is dependent upon subjective valuations and personal opinion."

If security analysis is ever to obtain the objective status of a science, it will be necessary: to specify the variables that determine suitable capitalization factors, to decide upon statistical measures which represent the impact of these variables, and to agree upon an objective procedure for measuring quantitatively the impact of a change in each variable upon the capitalization factor.

Before proceeding to a discussion of how statistical analysis can be used to aid in obtaining capitalization factors, it is desirable to dicotomize security analysis.

Murphy has noted that "perhaps the greatest need is for a method of valuing equity earnings in relation to (1) other investment media, and (2) gradations of value within the equity field." On this basis the science of security analysis can be broken down into two distinct but not necessarily separable phases. One phase is concerned with the problem of establishing a central value for a representative list of securities in relation to other types of investment media, such as bonds, savings accounts, real estate, commodities and money; these media can be viewed as constituting alternative investment opportunities outside the security field. The implication of a central value for a representative security index that is lower than the market price is that securities are priced high in relation to at least one other investment medium, and that investors "should" endeavor to substitute these media for securities until the market price of securities converges with its central value.

A second phase of security analysis is essentially concerned with the problem of establishing a central value for individual or groups of similar securities. The implication of a central value for an individual security that is lower than its market price is that the market price is too high relative to other securities and that investors should substitute "high" for "low" priced stocks up to the point at which prices and values converge.

PHASE I

THE DEVELOPMENT OF CENTRAL VALUE IN RELATION TO REPRESENTATIVE AVERAGES

A great deal of unintegrated statistical work has been done in an endeavor to strike central values for stock averages. The work has ranged from the naive to the very sophisticated. Some concept of central value is usually an integral part of all but the simplest formula plans. In recent years these plans have gained favor with institutional investors as a means of regulating the purchase and sale of common stocks.

One can classify the work that has been done under two categories: the price trend approach and the capitalized earnings approach. Most attempts to establish a central value for a representative average have concerned themselves with the problem of estimating an underlying trend in stock prices around which the average can reasonably

be expected to fluctuate. The kind of price trends used have ranged from a linear trend, as is the case with Oberlin College, or a logarithmic trend, as is the case with the Keystone Seven Step Plan, to a ten-year moving average, as is the case with the F. I. Du Pont Institutional Index. Templeton, Dobbrow & Vance have developed a somewhat more complicated normal price based on previous normals. The most complicated estimate of central price is undoubtedly that of Zenon Szatrowski. His method essentially involves a correlation between the logarithm of the annual average of Standard and Poor's index of industrials for each year and the arithmetic mean of the logarithms of the annual averages for the preceding years beginning with 1871.

The capitalized earnings approach to central value has several adherents. It includes Graham's concept in which he states that the central value of the Dow Jones industrial average is equivalent to the reciprocal of twice the rate of interest on Moody's AAA bonds times a ten-year moving average of earnings. Oglebay Norton uses a variant to this approach. Average conditions are assumed to exist when average earnings on common stocks are 1 2/3 times the yield on long-term high-grade bonds; Oglebay Norton make their own forecast of earnings for the Dow Jones industrial average, rather than resort to a moving average of past earnings. Robert Storer has normalized the earnings of Standard and Poor's 50 industrials by deflating the series and computing its logarithmic trend; the trend in earnings is then reinflated and multiplied by the factor 12.9—which represents the average historical relationship between normal earnings and the particular index of stock prices employed—to obtain a central value for the index.

Nicholas Molodovsky has used two different procedures in determining what might be regarded as central values for indexes of his own construction. His price orbit involves the capitalizing of a twelve-year moving average of earnings by a constant multiplier (14.8) derived from an average price earnings relationship that has existed since 1937. Recently he has fitted an equation to quarterly data on price, earnings, dividends, and lagged price which essentially combines the price trend approach with the capitalized earnings approach by including lagged price as a variable.

From the standpoint of practical formula planning, the inclusion of lagged price in the formula appears to have the advantage of increasing the number of transactions that could be made under the plan. On normative grounds, however, there is little reason to believe that last quarter's price should bear a particular relationship to the "true" value of the index. The use of confidence intervals as a means of controlling stock purchases and sales has considerably more statistical merit than an arbitrary range of operation established by guess.

An analysis of price trends seems to ignore the underlying determinants of price which are prospective earnings and the alternative return which can be obtained by investing in other assets. From an economic point of view, it is somewhat difficult to imagine why stock prices should trend upwards at a rate which might be relied upon to establish plausible normal values for security averages. In a general way, we do know that businesses retain earnings

and that this retention eventually reflects itself in higher stock prices; but this knowledge does not in itself provide firm grounds for assuming that business saving will increase stock values at a discernible rate that will maintain itself in the future.

In light of the theoretical and conceptual difficulties involved in the price trend approach to central value, it is truly amazing that the results which would have been obtained by price trend formulas, at least on paper, are often so striking. The question remains as to whether these results are the product of fortuitous circumstance or the product of underlying forces which can reasonably be expected to maintain a similar trend in the future. These doubts are not necessarily meant to disparage the price trend approach to central value, but to raise the question, on what rational economic grounds is it justified?

At this juncture the most appealing approach to central value is the capitalized earnings approach. Further research should be undertaken, however, to refine and improve the work that was initiated by Graham. High-grade bonds are not the only substitute for securities. One might well wish to ascertain the effect of changes in the rate of return/price of real estate and commodities. Monetary factors might also be taken into account. In addition to substitution possibilities, one would want to test the significance of earnings trends, the variability of earnings around the trend, and of price variability. These suggestions are meant only to be illustrative of what might be done to improve our knowledge of the determinants of central value. The inclusion of any variable in the central value model must ultimately rest on its being both statistically significant and theoretically plausible.

PHASE II

THE DEVELOPMENT OF CENTRAL VALUE THEORY IN RELATION TO INDIVIDUAL EQUITIES

There are essentially two methods of establishing a central value for individual stocks. The first method is identical to the way in which a central value can be struck for any stock average; one simply endeavors to determine, by means of time series analysis, whether the individual security is over- or under-priced in terms of historical relationships. The New England plan is an example of the price trend approach (based on a ten-year moving average) applied to individual common stocks. The work of Arnold Bernhard in his Value Line Studies is an example of the capitalized earnings approach applied to individual stocks, although it should be noted that his use of a lagged price really makes his work fall partially into the price trend category. The Burlingame plan and the Howe method might also be mentioned as constituting attempts to measure the central value of individual securities in terms of relationships that are internal to the historical behavior of each security.

The usefulness of these approaches is somewhat limited. While they serve to indicate whether a stock is over- or under-valued in terms of its own historical price and earnings, they do not necessarily answer the question: Is an individual security over- or under-valued relative to other

securities? The most fruitful approach to this latter question is cross-sectional analysis.

Two cross-sectional studies of different industries can be mentioned as leading in the direction of relative price analysis. The first is a study by George Cresson. In 1943 he correlated the mean high and low price of 32 leading oil companies with proven reserves per common share, dividends, and undistributed earnings. Recently John Collins has correlated the price of 37 bank stocks with operating earnings, dividends, book value, and net profits, and has suggested that:

"There is implicit in this method a prediction that if the market, generally, remains fairly constant, the stocks found to be below normal will tend to rise to normal, and that if the market, generally, rises, those below normal will tend to rise more than the others, and that if the market, generally, declines, the subnormals will tend to decline less than the others. For those above normal, the converse should be true. And these tendencies should persist until there is an appreciable change in the values of the determinants."

While Mr. Collins makes no attempt to subject the foregoing assertion to an empirical test, the idea that over- and under-valued stocks can be detected by observing the difference between actual market prices and those prices which are indicated by (or calculated from) cross-sectional correlation analysis, is nevertheless suggestive of a fundamental approach to security analysis.

Perhaps the finest statistical work that has been done in this direction of isolating the determinants of capitalization factors has been carried out under the auspices of the Public Finance Workshop in the Department of Economics at the University of Chicago. In a study of the "Determinants of Risk Premiums on Corporate Bonds," Larry Fisher has subjected the following hypothesis to a comprehensive empirical test involving several hundreds of observations which were taken during various periods of time:

"(1) The average risk premium on a firm's bonds depends on the risk that the firm will default on its bonds and on their marketability. (2) This 'risk of default' can be estimated by a function of three variables: the coefficient of variation of the firm's net income over the past nine years (after all charges and taxes), the length of time the firm has been operating without forcing its creditors to take a loss, and the ratio of the market value of the equity in the firm to the par value of the firm's debt. (3) The marketability of a firm's bonds can be estimated by a single variable, the market value of all the publicly traded bonds the firm has outstanding. 4) The logarithm of the average risk premium on a firm's bonds can be estimated by a linear function of the four variables just listed."

Haskel Benishay has recently launched a study of the "Determinants of the Differences in Rates of Return on Corporate Equity." His hypothesis is as follows:

"The rate of return on stocks is a function of (1) the expected variability of the future income stream, (2) the liquidity of the stocks, (3) the equity-debt ratio of the

firm, (4) 'age,' the time lapsed since last period of major down-turn in the firm's fortunes (reorganization), and (5) some relevant measure of the trend in a company's ups and downs."

Since interest and the rate of return are nothing more than the reciprocal of capitalization factors existing in the market, a study of their economic determinants is of great value to security analysis. If the important economic determinants of capitalization factors can be isolated by means of cross-sectional correlation analysis, they can be used to aid the analyst in making statements with regard to the question of how a stock ought to be priced relative to other stocks.

CONCLUDING REMARKS

It is to be expected that a suggestion to rest security analysis on a statistical foundation will be met with mixed opinion and emotion. On one hand, those analysts who are statistically oriented are apt to applaud the suggestion without recognizing its limitations. On the other hand, those who find it difficult to think in terms of algebraic relationships and probabilities are apt to meet the suggestion with suspicion and hostility. It is only fitting that my concluding remarks be dedicated to those analysts who place their faith in "intangibles" and variables which are peculiar to individual firms and, hence, do not lend themselves readily to quantitative analysis. Paradoxically as it may seem, it is this group which stands to gain the most from the development of security analysis as an applied mathematical science. If a correlation of security prices with the more important economic determinants should disclose, for instance, that a particular stock or group of stocks is under- or over-valued, it is for the trained and experienced analyst to search for variables, such as factors of account, which

have been excluded from the more general model, but might justify a discrepancy between price and indicated value.

It would surely be naive to assume that any statistical model is an infallible indicator of "true" value. Its indications must always be interpreted in light of the possibility of biased observations and of plausible relationships that were excluded from the model for practical reasons and for want of generality. To the extent, however, that other reasons cannot be advanced in support of deviations, they serve as evidence of irrational pricing and forewarn of price adjustments that may be in the offing at some future time. Models of the security market can be looked upon as providing a frame of reference from which to initiate more intensive studies of individual situations; the model's residual deviations can be looked upon as indicating directions in which further study may be warranted.

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Laboratories

The Board of Directors has declared the following quarterly dividends, payable January 2, 1958, to stockholders of record December 6, 1957.

- 45 cents a share, plus an extra dividend of 10 cents a share, on Common stock.
- \$1.00 a share on Preferred Stock.

114TH

CONSECUTIVE DIVIDEND

Nov. 26, 1957 / North Chicago, Illinois

Pacific Gas and Electric Company

DIVIDEND NOTICE
COMMON STOCK
DIVIDEND NO. 168

The Board of Directors on December 18, 1957, declared a cash dividend for the fourth quarter of the year of 60 cents per share upon the Company's common capital stock. This dividend will be paid by check on January 15, 1958, to common stockholders of record at the close of business on December 27, 1957.

K. C. CHRISTENSEN,
Treasurer
San Francisco, Calif.

P·G·and E·

RADIO CORPORATION OF AMERICA



Dividend Notice

The following dividends have been declared by the Board of Directors:

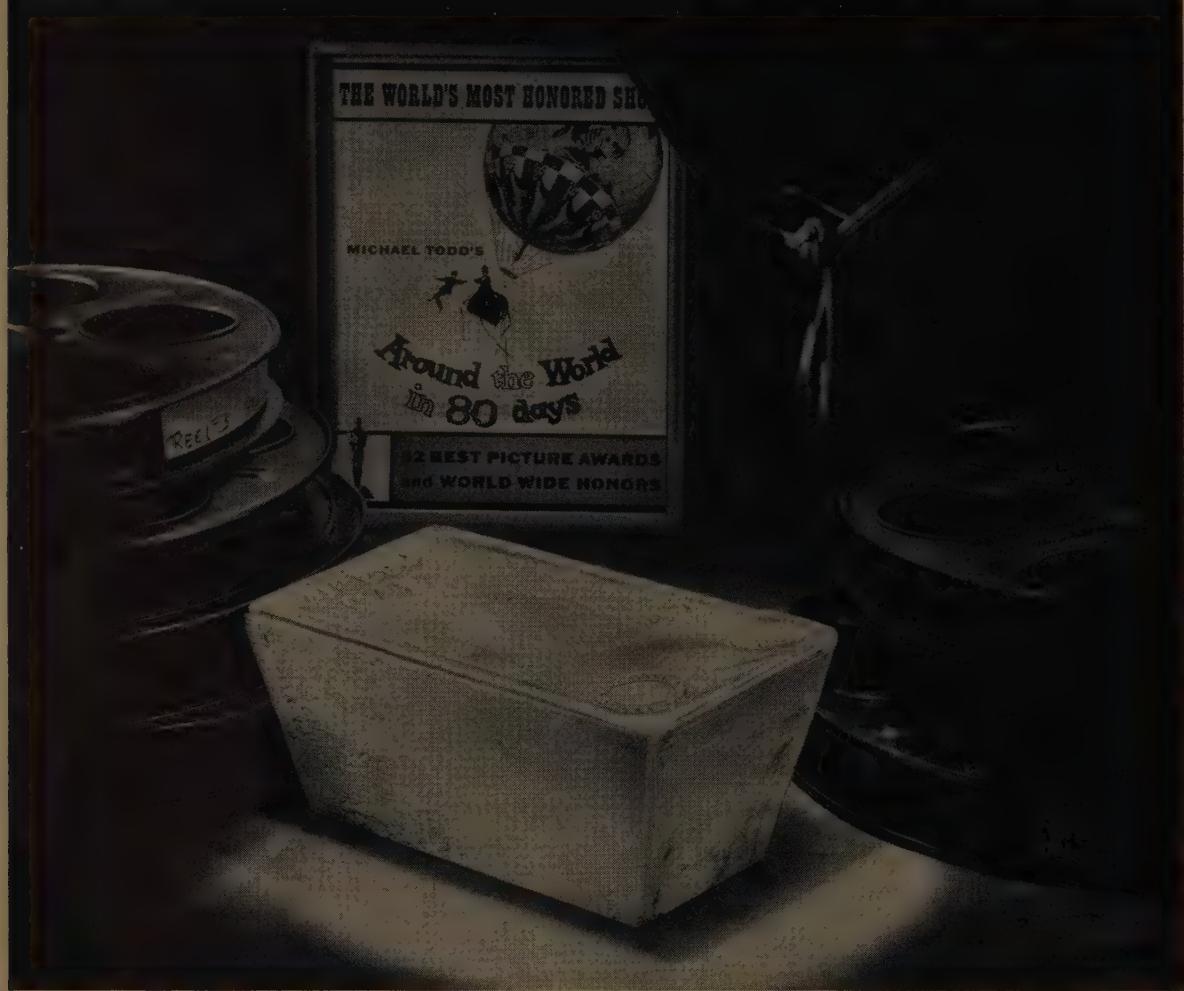
First Preferred Stock

87½ cents per share on the First Preferred Stock, for the period January 1, 1958 to March 31, 1958, payable April 1, 1958, to stockholders of record at the close of business March 10, 1958.

Common Stock

An extra dividend of 50¢ per share and a quarterly dividend of 25¢ per share on the Common Stock, payable January 27, 1958, to stockholders of record at the close of business December 20, 1957.

ERNEST B. GORIN,
Vice President and Treasurer
New York, N. Y., December 6, 1957



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The Effect of Pension Fund Investments on Common Stock Prices

H. W. STEINHAUS

THE INCREASE IN THE ASSETS of corporate pension funds, and the trend towards investing an increasing portion of such funds in common stock naturally has raised the question as to the effect of such investments on the common stock price level. This article will examine some of the issues involved.

WHAT ARE THE FACTS?

Based on S.E.C. figures, the proportion of assets of corporate pension funds invested in common stocks has increased continuously. In 1951 common stock holdings totalled \$812 million, representing 13% of the total assets of such funds of \$6.876 billion. In 1956, common stock holdings had risen to \$3,774 million, representing 26% of the total assets of \$16,639,000,000. In 1951 about one-fifth of the net receipts of pension funds (\$1,350 million) was invested in common stock, but in 1956 this ratio had risen to one-third, and since the net receipts of corporate pension funds totalled \$2,400 million, about \$800 million went into common stock. On the other hand, the proportion of new funds going into corporate bonds has been steady, averaging about 57%. The proportion of other assets, Government bonds, preferred stocks, mortgages and cash decreased correspondingly.

Prevailing opinion minimizes the effect of these purchases on the stock market. First of all, it is held that the amount involved is small in relation to the total value of stock traded on the exchange. Secondly, the Chase Bank experience over a 16 months period¹ indicated that common stock purchases were spread over nearly 200 issues. This indicated that "The over-all impact is compounded of many considerations that make trustees sellers as well as buyers, and in total their activity is only one element among many that enters into the demand for and supply of stocks."

There is no question that the 1954 purchases were not significant in terms of the total value of stock traded on the exchange, but the purchases have risen until, in 1956, these self-administered private pension funds purchased common stock equivalent to about 25% of the entire stock financing undertaken by corporations in that year. Vito Natrella of the S.E.C. believes that this trend is continuing and estimates² that stock holdings by corporate pension funds will have quadrupled by 1965.

Moreover, while it is true that the purchases of these trusts are mostly distributed over some 200 securities, they concentrated on relatively few issues. What these issues are can be seen in a study of the New York State Banking De-

partment relating to funds held by state and national banks in New York State.³ Table 4 of that report lists the stocks held, their relation to the total volume of shares outstanding, and the number of funds holding these particular shares. Two-thirds of all funds invested in common stock went into 60 leading stocks.

WILL THESE PURCHASES CONTINUE?

The general impression has been conveyed that the regular purchases of common stocks by these corporate pension funds will tend to stabilize the market. Using dollar averaging investment procedures, these funds are supposed to continue buying in good times, as well as in bad times, providing thereby at all times a reasonable assurance that sellers will find a basic market. This view may turn out to be quite erroneous, particularly in 1958, for the main reason that there is no assurance that employer contributions to corporate pension funds may not be substantially reduced. While employee contributions would still flow in, such receipts are the least likely to be invested in common stocks. Referring once again to the New York State experience, in the last fiscal year examined, income from assets balanced the outgo for benefits and expenses, and, therefore, the employer contributions (over \$2 billion in 1956) represent the critical sum to be invested in common stocks.

The ability of employers to reduce or even suspend contributions is inherent in most corporate pension trusts, particularly after a number of prosperous years in which the employers made contributions as large as permitted under the corporate income tax laws. The Internal Revenue Service does have a control on employers' liability for contributions, but does not currently require a contribution, as long as the employer's current unfunded liability does not increase to a point where it exceeds the employer's original unfunded liability. This is an abbreviated statement of the actual ruling (PS 57), but the effect is sufficiently clear. The chances are that practically all plans under which substantial contributions were made over the last few prosperous years may have sufficient margin to operate over the next few years without any employer contributions. According to the New York State Study, the employers involved had wiped out about two-thirds of their past service liability as early as 1953, and are likely to be in an even better position by now.

The question is whether employers would reduce contributions, and to what extent. Many of the larger corporations that have settled on a definite schedule of amortizing their unfunded liabilities are not likely to deviate without important reasons. To find out, a telephone survey was

(1) 9/1/53-12/31/54, John McCloy in Commercial and Financial Chronicle of 3/17/55.

(2) 1957 Proceedings of the American Statistical Association, Business and Economics Section.

(3) Preliminary report issued by the Superintendent of Banks in 1955.

made early in December, among a number of consulting actuaries, insurance companies, banks and lawyers administering pension trusts, who indicated that quite a number of employers intend to reduce their contributions next year in anticipation of reduced earnings and profits. In consequence, during a year when stock prices are likely to be depressed because of business conditions, the stabilizing effect of pension fund common stock investments will be reduced.

It appears, therefore, that these pension trust funds may have a somewhat unstabilizing effect, increasing purchases during prosperous times, and decreasing them during poor times.

OTHER LONG-RANGE ISSUES

Except for the element of employer contributions, nothing else is subject to rapid change in pension fund operations. This is most obvious with respect to benefits which usually increase slowly, as the covered employees reach retirement age in increasing number and with increasing benefits, because of longer period of service under the plan. Only occasionally benefit payments may jump a little, when unions obtain collective bargaining concessions or because of the increased voluntary efforts by employers to repair the effects of inflation on pensions, which adjustments are sometimes applied retroactively to those already on the pension rolls.

Less obvious is the effect of increased benefit levels on employer contributions. There has been a definite trend

towards more liberal benefits, mostly to offset the effect of inflation on retirement benefits expressed in dollars. Investments in equities are supposed to operate as a hedge against inflation, thereby minimizing, over the long run, the cost to the employer of adjusting pension benefits to a rising price level. This trend is the basic reason for expecting a rising level of equity investments.

However, an increase in benefits does not imply that there must be increased employer contributions in any particular year. Naturally the adoption of a new plan would lead to increased investments, but where benefits are increased in an existing plan there are several possibilities whereby an employer may be able to absorb increased costs without actually increasing contributions. One simple method used, for instance, in the United States Steel case, was to extend the amortization period of unfunded liability from ten, to thirty years. While the total liability would naturally rise, the annual amortization would be held at the same level or even a lower level.

The conclusion must be reached that there is not the prospect for support of stock prices in a recession thought to be inherent in the operation of pension funds investing in common stock. Over the long run the unstabilizing effect may even grow, because of the growth of benefit payments. As soon as benefit payments, plus withdrawal payments exceed income from assets, plus employee contributions, cessation of employer contributions would actually require liquidation of investments, though probably first affecting the bond portfolio.

ROME CABLE CORPORATION

ROME, NEW YORK

75th Consecutive Dividend

The Board of Directors of Rome Cable Corporation has declared consecutive Dividend No. 75 for 35 cents per share on the Common Stock of the Corporation, payable January 3, 1958, to holders of record at the close of business on December 20, 1957.

GERARD A. WEISS, Secretary
Rome, N. Y., December 10, 1957

CONSOLIDATED NATURAL GAS COMPANY

30 Rockefeller Plaza
New York 20, N. Y.

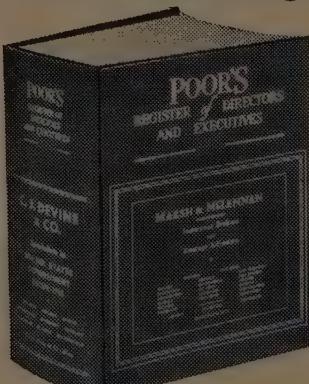
DIVIDEND NO. 40

THE BOARD OF DIRECTORS has this day declared a regular quarterly dividend of Fifty Cents (50¢) per share on the capital stock of the Company, payable February 15, 1958 to stockholders of record at the close of business January 15, 1958.

R. E. PALMER, Secretary
December 12, 1957

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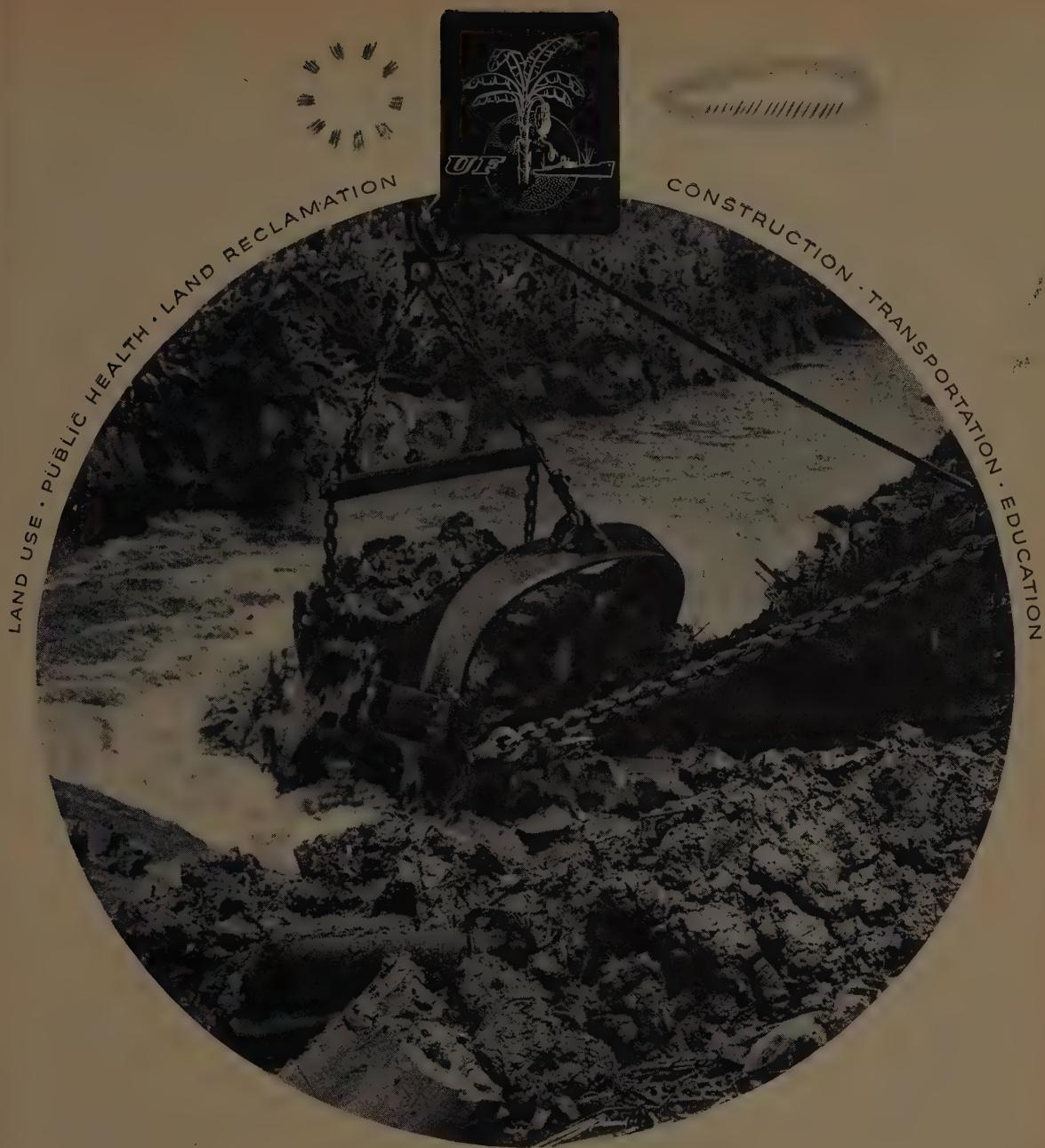
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TV—The Second Decade

IRVING KAHN

AMERICAN MASS TELECASTING is now ten years old. Set number one million appeared in 1948, since which time some forty million units were built and sold. Despite retail cost dropping from \$390 to \$185, set sales this year will collect about \$1.2 billion dollars which equals TV's annual advertising income.

Industry output up 4000% looks impressive next to population up 20% and household formation up 25% in these 10 years. However, we must admit that the original set market is approaching a ceiling. This year more than 81% of American homes have one TV set. Almost fifty years passed before the telephone reached this degree of saturation.

The industry looks for annual replacement of old sets, second sets and new family formation to take about seven million sets a year.

For an historical frame of reference, we might tabulate the major earlier improvements in the art of communicating from a distance.

Table I

Invention	Method	Invented	Common Use By About
Tele-Graph	Coded Writing Via Wire	1837	1860
Tele-Phone	Voice Via Wire	1876	1912
Silent Cinema	Action Photography	1905	1918
Radio Phone	Audio Modulated Sound Via Aether	1920	1927
Sound Cinema	Sound Added to Action Photo.	1927	1934
Radio Phone	Frequency Modulated	1939	1945
Television	Action Photography Plus Sound Via Aether	1929	1947

Note the shorter periods between invention and common use as we approach the present time.

Communication devices before radio were point to point. Radio and TV are literally cast abroad, their contents receivable by any receiver tuned to the sending frequency.

Every town in the United States with ten thousand people is now receiving somebody's telecast every day. With the added several million sets in public places literally every healthy American is accessible to a telecast.

The receiving end of the art is not as bright a picture. Look at your own TV set. The picture is under four square feet. What you see is usually 1/6 of life size. The close-up restores part of this size but puts blinders on you. Distant shots zoom you back to the rear of the balcony. The feeling of participating in the scene, with the people present in the theatre or at the movies is too difficult with present screen sizes. Sound is better than the old AM radio, but not yet in the class with good hi-fi gear. Picture reliability and lack of

break-down are far from what we are used to from professional movies.

TV'S SECOND DECADE

What is the promise of TV's second decade? Picture size, by projection will be about home movie screen size—three feet by four feet—three times today's. We will have reliable color. We may have simulated third dimension.

This future model will be really portable because of full use of transistors, printed circuits and smaller projection tube. It will be battery powered, probably charged by solar cells. Channel coverage will be far wider than now—widening the station choice at least three fold. Cost should be below where sets first sold in 1948.

Some intelligent analyst here raises his hand to say he either does not own a set today or rarely looks at one, so why bother about a future model?

What does the average viewer have by switching on his present set? If he is a big-city dweller, he can choose from seven channels made up of three major net works plus his local stations.

All but a few percent of stations are commercial enterprises whose earnings originate with advertisers payments. With the object of reaching the largest audiences, programs are naturally prepared for mass acceptance. It is no surprise that young people are TV's most loyal audience—programs are keyed down to the less mature mind. Nor should we forget that the well planned commercial can be more entertaining than the show. Rightfully, the man who pays the piper calls the tune.

The speed and breadth of TV's success imposes a real strain on its ability to find a full day's entertainment. So new an art, it must draw on the older arts of movies, theatre, radio and sports. The parlor guessing game, with sweepstakes-size money to thrill the most jaded watchers, currently ranks high in audience appeal. Movies finished between 1937 and 1948 have proven profitable filler. What follows the ultimate exhaustion of old flicks? Each set owner indirectly pays only a few pennies a day towards the expense of buying and producing the show. So long as this be true and advertisers selling mass consumed products are TV's sole measure of support, we must expect mostly mass audience programs.

Fortunately, we do get some convenience programs. Slightly bettering radio with visual aids, we see and hear weather and time, headlines of national and local news are presented for the small cost of "and now a brief message from our sponsor." Long conditioned by ad-filled newspapers and magazines and radio, most of us accept the swap of information for a brief sales pitch as part of the American way of life.

We have bought tickets in village movie houses where intermission slides were part of the show. We have also known how rarely a city movie house would dare show the

audience anything other than the two features and shorts they paid to see.

Some hopeful signs of lifting TV programs nearer adult levels are found in public service programs.

Most of us have enjoyed and profited from the subjects and treatment on such network programs as: Face The Nation; Meet The Press; Ask Congress; Youth Wants To Know and College Press Conference or the local legislature reporting on inquiries like: Citizens Union Spotlight and New Jersey's Gov. Meyner Weekly Report.

When an election draws nigh TV time takes on a heightened value to aspirant and incumbent alike. More responsible incumbents realize that one path to re-election is to make progress reports between elections.

NATION-WIDE NETWORKS

Nation-wide networks show us the President and members of his Cabinet for intermittent reports to the people. Broadcast coverage and attention response put TV ahead of any medium. Legislative bodies can actually be as dramatic as a Broadway play. Recall the intense interest from all walks of life in the Kefauver hearings or the Senate Committees Hearings on McCarthy.

Although the West German Bundestag has permitted itself to be televised, our own Congress has yet to consent. Why can't we watch our law-makers and regulatory agencies and courts at work? Won't this help serve a bemused citizenry, half of whom rarely bother to use their voting privilege? Shouldn't the agency responsible for regulation of TV itself be the first to Televise its own hearings? Sometime during their seven year tenure the public should see and hear the seven men who regulate the air-waves, the commissioners of the FCC.

In at least one area TV has lived up to its early promise, the telecasting of sports events. From little leaguers to old grads most of us enjoy watching sports. The screen places the game or contest smack before your favorite chair. An unseen professional commentator keeps score, interprets the action, quotes player's and team's records. The telephoto lens puts you right at the action as no seat in the stands could. No uncertain weather, traffic or parking jams. Fees from telecasting sports can exceed the attending box office. A recent golf match was designed solely for its TV audience.

TV exhibition income should help schools, Olympics and other non-commercial sports.

Why not use TV to upgrade American sports achievements? Shouldn't we be fed up with regular trimmings in tennis by a nation 1/17th our size? Instead of seeing TV tennis once a year at Forest Hills, our hopefuls should be shown the competent tennis clinics all over our South and West. Some sports instruction is going on all over the United States, but our youngsters do not get much help from their TV's.

Some telecasters do bring forth adult subjects and treatment to selected night time audiences. Studio One, Playhouse 90 and Television Playhouse are examples.

Perhaps the pioneer cultural success has been *Omnibus*.

Ford Foundation's TV Work Shop created *Omnibus* back in 1952. Five years and \$2 plus millions later, they let it carry on for itself. Like its name *Omnibus* showed many

subjects, classical and contemporary literature and drama, current affairs, sports, history, biography, science and art. To the sceptic we point out that advertisers paid about ten times the Ford subvention to carry on *Omnibus*.

We have the entire world's wealth of material in the arts and sciences available for programs for all age groups. But programs cost money to produce. Who will pay for them and in what manner?

THE INTELLIGENT VIEWER

The who part is easily answered, the viewer who believes they are worth the price. The intelligent viewer may ask telecasters to redress the imbalances between poor programs and worthwhile programs. He may surprise us by putting up new money for what he wants to see and cannot get now.

As to how make payment—this is the hot potato the FCC has been bobbling about for some recent years.

For something as yet unborn it has lots of names. Fee TV, pay TV, subscription TV, Phonovision, Skiatron, Cable theatre and more. They all try to collect the viewer's money based on an elapsed time watching of a given channel. The technical means of collecting from a subscriber without conflict with present ad paid TV, include dialed codes, punch cards and coin boxes for standard aerial reception. The cable theatre is a direct co-axial connection to the source of the telecast—presently a movie projector. The virtues and faults will be further aired before the FCC this Spring when fee TV trials will be more widely permitted.

Fee TV experiments to date have shed little light on a workable solution. Tests have been scattered as to places and times. Conducted by partisans they have, above all, been without the check of a real control group. Set owners tested have a limited choice: (1) make no visible payment other than your time and patronage of an advertiser's product and get the only programs you have known to date, or (2) pay regular or intermittent fees to see current hit movies, shows, opera and main sporting events. Only time can show how big are the groups who prefer selecting their own fare over a fixed "free" lunch.

As TV has grown, movie house attendance has fallen by about half. On the "if you can't lick 'em, join 'em" dictum, most movie producers have released their pre 1948 film for TV showing. Barring a miraculous revival in attendance, it cannot be too long before post 1948 films will fill our screen.

EXPERIMENTS IN THE MOVIE INDUSTRY

The movie industry has been flexible enough to produce special movies for TV showing. These are full features that run for 28 minutes. They have also produced, importantly, the animated commercials we see at most quarter hours.

An experiment was started at Bartelsville, Oklahoma showing first-run and other movies directly and ultimately, simultaneously from the local movie house via co-axial cable for \$9.25 monthly. It will be tried in other areas closer to population centers, and sports events will be added for this fee.

The economics of fee TV are impressive. Thus if only 10% of all set owners pay \$5 monthly, this fractional fee

income equals \$240 million. This is almost 1/4th of all income currently paid by all TV advertisers. Second sets permitting a choice at the same hour, public place sets, theatre projected events, would all be added to such home fee TV income.

A major area of F.C.C. inaction has been educational TV. Many educators, leading citizens and legislators feel that educational institutions cannot do their full job without owning and operating their own ad-free stations. The history of the station freeze and creation of new ultra high frequency channels which very few sets can receive is not a happy one.

Some educational institutions have gone ahead with various portions of their teaching programs. They have started telecasting or internal closed circuit wired televising of their own educational programs.

Penn State cut costs 40% in teaching four subjects. Washington County, Maryland, found TV teaching good enough for the 6 thousand students they tried it on, so that by 1959 they plan to extend it to all 20 thousand in the county.

Portchester, New York tried it for both music and history.

The school system in Atlanta, Cincinnati, Detroit, Miami, Norfolk, Oklahoma City, Philadelphia and Wichita are at it this year. Alabama, Nebraska and Oklahoma are trying it on a state wide basis.

It is plain that teachers have approached TV teaching with caution and reservations. Yet such control comparisons between groups taught the same things by "live" and by televised teachers, show tested retention one day and one month later favoring teaching by TV.

The shortage of teachers is too well accepted to require proof. Most teachers are hired and paid for by local taxing groups. The same teacher can instruct several classrooms simultaneously with one camera and a receiver for each classroom. The one time cost, installed, of their equipment is usually less than the annual cost of adding a new teacher. With no nearby prospect of a quick growth in teachers, TV teaching should grow. It is also a way to use the most experienced and effective members of the faculty.

At the college level wide spread use of TV sets may bring student costs down to below tuition fees collected and thus permit much needed expansion.

On the students' side, everyone agrees that we waste thousands of talented boys and girls whose family budgets preclude finishing high school or going to college or professional schools. The President's annual message recommends some funds towards partial remedial action. If TV teaching can cut the heaviest expense of all, their teacher's salary costs, we must start now. Since leading scientists come from all walks of life, the broad diffusion of science teaching is a major need.

Perhaps we should heed Admiral Rickover when he said "Nothing short of a complete reorganization of American education, preceded by a revolutionary reversal of educational aims, can equip us for winning the educational race with the Russians."

Encouraging teen age boys and girls to try their heads and hands at science projects outside of school is also im-

portant. The pioneer work by Watson Davis and his associates in Science Service includes publications like the Weekly Science News Letter, the monthly Things of Science and the Westinghouse Talent Search and Science Fairs all deserving broad recognition and national support. Certainly this popularization of science could be helped by TV.

America is a big land surrounded by two oceans and two smaller neighbors. This sometimes makes us forget that over 95% of the human race live elsewhere. Unlike Europeans, we tend to use only our native English which further cuts us off from communicating with other people. At present few Americans listen to foreign short wave broadcasts.

INTER-CONTINENTAL TECHNIQUES

TV in its second decade will be tuned in surely on European telecasts and probably on some remoter parts of the globe. Inter-continental techniques are already at hand, like the ocean cable.

Others are attainable, like a chain of booster or translator stations, say Scotland, Greenland, Iceland and Canada. Possibly we will use scatter by the troposphere, or, what seemed so unlikely until last October, a man-made satellite to reflect signals.

However slow we may be to import the best, say of the BBC, and other country's best programs, time is running out for us. The big battle of this cold war is the battle for men's minds.

If we show Europe and Asia the American ways of daily living versus Russia's way, we need not fear the world's judgment. But Mr. Khruschev has effectively shown the need for actively exhibiting the American way of living before other people.

Europe now has ten million TV sets and is very rapidly adding new ones. England, Switzerland, Norway and Israel are modifying their government monopoly status and have opened up TV to modified private operations. Until inter-continental TV is practical, shouldn't we be sending them our best in quality entertainment, public service and educational programs on film or video tape? Shouldn't we be producing programs that they would like to see for their intrinsic merits, like Danny Kaye's UNICEF travels or "Victory At Sea" or Ed Murrow's "See It Now"?

Printed material, especially that diluted through a translation can not deliver the punch of direct sight and sound in action. It is still true, especially of simple folk, that "seeing is believing."

Another way to leap over the iron and bamboo curtains is to show actual films of life under communism, in say Hungary or Poland. Even if neutrals alone see these the facts will trickle back behind those curtains.

Longer term foreign programs can be a permanent part of our domestic TV shows. Initially, language courses sponsored by our schools and colleges should be started.

A Romance Language professor built and holds an audience five mornings weekly from 6:30 A.M. to 7:00 A.M. explaining comparative literature in English. Learning English would attract and instruct countless new Americans.

There must also be a sizable untapped audience who want

to relearn their parent's native tongue—or students who want help by superior teaching, or travellers who want basic French, Italian, Spanish or German.

With a modest command of a second tongue, foreign language programs can be imported and our own exported in exchange. Some foreign programs are incorporated in New York's high quality station WNYC. This public station via AM and FM gives 16 and 24 hours daily of the very best in music, public service and imported foreign programs. All this for a cost of less than \$1 per year per monthly listener. It is our form of economic mores, not cost accounting, that keeps commercial radio and TV down where it is. The advent of new educational U. H. F. stations should stimulate the older stations to upgrade their material.

The industry must soon take the initiative for self-improvement or the public likely will.

There is a wide range of self-interest. Some corporations make sets and own networks, others just make sets. Some telecast exclusively, others own TV and radio stations and newspapers.

COSTS

As equipment costs drop, we see wider applications in industrial TV with existing uses in steel mills, railroad terminals and classification yards, generating stations and even grocery super markets. There are many places where the hand and eye are better remoted via a TV camera and screen. Even annual meetings have been telecast simultaneously in New York and Chicago.



INTERNATIONAL HARVESTER COMPANY

The Directors of International Harvester Company have declared quarterly dividend No. 158 of one dollar and seventy-five cents (\$1.75) per share on the preferred stock payable March 1, 1958, to stockholders of record at the close of business on February 5, 1958.

GERARD J. EGER, Secretary

230th CONSECUTIVE QUARTERLY DIVIDEND

The board of directors of The Electric Storage Battery Company today declared a regular quarterly cash dividend of 50 cents a share on common stock outstanding, payable March 31, 1958 to stockholders of record March 10, 1958.

E. J. DWYER
Vice-President & Secretary

February 5, 1958

THE ELECTRIC
STORAGE BATTERY
COMPANY



Dividend Notice

JEFFERSON LAKE SULPHUR COMPANY

The Board of Directors, at a meeting held on February 3, 1958, declared the regular semi-annual dividend of 85c per share on the Preferred shares and a regular quarterly dividend (No. 59) of 80c per share on the Common shares, both payable March 10, 1958, to shareholders of record February 24, 1958.

CHAS. J. FERRY
Vice-President &
Secretary

ALLEGHENY LUDLUM STEEL CORPORATION

PITTSBURGH, PENNA.

At a meeting of the Board of Directors of Allegheny Ludlum Steel Corporation held today, November 21, 1957, a dividend of fifty cents (\$0.50) per share was declared on the Common Stock of the Corporation, payable December 21, 1957, to Common Stockholders of record at the close of business on December 2, 1957.

S. A. McCASKEY, JR.
Secretary



UNITED FRUIT COMPANY

235th Consecutive Quarterly Dividend

A dividend of seventy-five cents per share on the capital stock of this Company has been declared, payable April 15, 1958, to shareholders of record March 14, 1958.

EMERY N. LEONARD
Secretary and Treasurer
Boston, Mass., February 10, 1958

AMPHENOL

AMPHENOL ELECTRONICS CORPORATION

"At a meeting of the Board of Directors of Amphenol Electronics Corporation held today a quarterly dividend of thirty cents per share was declared, payable January 31, 1958, to the shareholders of record at the close of business January 17, 1958. The transfer books will not be closed.

Dated at Chicago Nov. 26, 1957.

FRED G. PACE
Secretary

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The Growth Pattern in New Jersey continues strong

What
happened in
New Jersey in 1957?

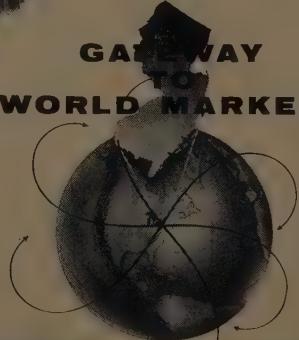
Industry kept right
on growing, commercial es-
tablishments kept on expanding,
and residential areas continued to
show a year of healthy growth.

A vacuum cleaner manufacturer built
another plant in the same town in which they
have been operating. Many small firms merged
with large nationally known companies.
Ground was broken for several large indus-
trial research laboratories. A large new
asphalt refinery was built. Plants
were constructed for the manu-
facture of baby products, sur-
gical dressings, soup,
paper milk bottles and
electric wire and cable.
Large warehouses for storing
steel furniture and motor
parts were built. Major
cities forged ahead with urban re-
development, and shipping facilities at
Port Newark and on the Delaware River
were enlarged and improved.

All in all, it was a dynamic year of growth in
New Jersey, where 50 of the top 73 "Blue Chip"
companies in America are active. We have every
reason to believe that this growth will continue into
1958—plant site inquiries so indicate.

To meet this growth, Public Service con-
tinues to enlarge its facilities. We have
expended over \$500,000,000 in the
last five years, and at the pres-
ent time we are constructing
three major elec-
tric gener-
ating
sta-
tions.

**GATEWAY
TO
WORLD MARKETS**



The Outlook for the Electric Utility Industry

P. P. STATHAS

IN VIEW OF THE UNCERTAINTY as to the trend of the country's over-all economy in the near term, a review of the outlook for the electric utility industry should be of interest at this time.

Total kilowatt-hour sales of the electric utility industry in 1957 will probably show an increase of about 7½% over 1956. The industry is now experiencing a slower year-to-year rate of gain in kilowatt-hour sales. In 1956, total kilowatt-hour sales showed an increase of 10¾% over 1955. Industrial kilowatt-hour sales will probably show an increase of about 5½% as compared with a rate of 10½% in 1956. These industrial sales include kilowatt-hour sales to the Atomic Energy Commission, a big electric energy consumer, which in 1956 used a peak of 58½ billion kilowatt-hours, accounting for almost 10% of the total electric energy produced in the United States. In 1957, industrial power sales to A. E. C. installations will show a drop of about 3.4% from last year, and this partly accounts for the projected lower rate of growth in industrial sales this year.

The encouraging thing is that the higher priced residential and commercial sales will still show a good rate of growth in 1957. Residential sales this year are likely to show an increase of about 10%. A somewhat higher rate of growth is expected in 1958. This is the result of a residential customer increase of about 1.2 million and of an increase in the average use per residential customer of over 7%. Similarly, it is estimated that sales to commercial consumers will show an increase of about 8½% over 1956.

Since December 1956, the percentage year-to-year increase in operating expenses began to exceed the year-to-year percentage gain in operating revenues, and, as a result, the net operating revenue gain on a 12-month basis is now running at a little more than 4%, notwithstanding a corresponding 6.8% gain in electric operating revenues.

The net earnings for Common, are estimated to show an increase of about 5% to 6% in 1957 as compared with 1956, but in the event of adverse economic conditions during the balance of the year, this increase may be shaded somewhat. The results for individual companies will, of course, vary considerably. For a limited number of companies, the net for Common is running somewhat below the figures reported in the corresponding period of 1956. However, for the most part, there have been continued gains in net income. Over-all, and barring unfavorable business developments, continued gains in the industry's earnings should be anticipated, although at a reduced rate from the gains experienced in recent years.

LAST YEAR'S DIVIDEND INCREASES

Last year experienced a goodly number of dividend increases but the number of dividend increases thus far in 1957 has been considerably less than during the same period in 1956.

Considering all factors, the electric utility industry is still

showing good performance, and this attests to the recession-resistant characteristics of the industry. Some time ago we made a study to determine the effect on electric utility earnings of a recession similar to that experienced in 1937-1938. As will be recalled, that was a relatively sharp recession. Our study indicated that, should a recession of that type occur, total kilowatt-hour sales would decline about 8.7%, operating revenues would decline 2.8%, and the balance for Common would show a drop of only 4½%. The sample used in making this study was rather sizable and represented a group of companies obtaining a greater than average portion of revenues from industrial customers. The over-all decline of 4½% in the balance for Common is therefore quite moderate. For individual companies the results varied from a gain of 3½% to a decline of 14½%, and this emphasizes the necessity for selectivity in picking electric utility Commons. The median decline in net for Common was 3½% and in no case did the current dividend appear in jeopardy. On the whole, the results of our latest study indicated that electric utility companies will continue to have excellent defensive qualities in periods of business readjustment.

Even if a recession of the type visualized in the study should occur, with a duration of 15 to 18 months, the higher priced residential and commercial classes of service would continue to show revenue increases which would offset to a very large extent, if not entirely, the drop in industrial kilowatt-hour sales. It is important to remember in this connection that it takes a gain of only 3½ to 4 kilowatt-hours in residential sales to completely offset in terms of revenues the loss of 10 kilowatt-hours in industrial sales. This is due to the rate structure of the utility companies under which a kilowatt-hour consumed by a residential customer, for example, produces 2½ to 3 times as much revenue as a kilowatt-hour sold to an industrial customer.

STABILITY OF EARNINGS

There are, good reasons for the stability of earnings. Among these are the utilization of more efficient generating capacity, a continuing increase in residential and commercial kilowatt-hour sales, the tax cushion, which is of course common to all companies whether utility or industrial, and many other factors.

The electric utilities are fundamentally blessed with a favorable cost curve. There are three important variables which affect a utility's costs of rendering service, namely, load factor, average consumption per customer, and customer density. The average consumption per customer is particularly important. For example, when the average kilowatt-hour consumption per customer of a company operating at a given customer density and load factor goes up from 2,000 to, say, 4,000 kilowatt-hours, the corresponding cost per kilowatt-hour sold drops to about 79% of that in-

curred at the 2,000 kilowatt-hour consumption per customer level. If the consumption goes up to 5,000 kilowatt-hours, the cost drops farther to about 73%.

Similarly, if the annual load factor is increased from 40% to 60%, with customer density and average kilowatt-hour consumption per customer remaining the same, the cost per kilowatt-hour sold goes down about 19%.

Customer density is best measured in terms of customers per mile of distribution line. Customer density exerts a tremendous influence on the investment per customer for distribution facilities, and this, in turn, affects the fixed charges per kilowatt-hour sold. Strictly urban companies have a density as high as, say, 125 customers per mile of distribution line. If we take the average cost per kilowatt-hour sold at this density as a base, then the corresponding cost per kilowatt-hour sold, with other variables remaining the same, would go up about 20% if the same company had a density of only 20 customers per mile of distribution line.

All of these variables are still continuing in a favorable direction. An exception would be in the annual load factor of some companies serving areas where abnormally high air conditioning demands during the summer months distort the annual load curve. Successful promotion of new winter loads, such as the heat pump, will correct the situation of such companies as time goes on.

CONSUMPTION PER CUSTOMER

The average consumption per customer, which is by far the most important variable, has been and is likely to continue showing very favorable increases. For example, the annual usage per residential customer in 1956 was around 2,969 kilowatt-hours and for 1957 this will be in the neighborhood of 3,180 kilowatt-hours. Estimates indicate that this average usage will go up to about 3,400 kilowatt-hours in 1958, to 3,700 kilowatt-hours in 1959, and to more than 4,000 kilowatt-hours in 1960.

These increases, together with the improvement in the other variables which will undoubtedly take place, should keep the net earnings of the electric utilities in good shape, and the law of diminishing returns will still be way beyond the horizon for years to come. Some companies will need rate increases but these will be of modest proportions and it is reasonable to expect that they will be granted by regulatory commissions without undue difficulty.

The industry has been able to offset the inflation in construction costs by going to larger generating units and to higher transmission and distribution voltages. For example, the installed cost of a 100,000 kw. generating unit, including the step-up transformers, is around \$150 per kw. By going to a 200,000 kw. unit, the cost per kw. is reduced to around \$130, and by going to a 400,000 kw. unit, the cost can be reduced to about \$118 per kw. Operating and maintenance costs are similarly reduced on a per unit basis. The 100,000 kw. unit, for example, would have an annual operating and maintenance cost of about \$8 per kw.-year, whereas by going to a 200,000 kw. unit, the annual operating and maintenance cost gets down to about \$5.80, and to \$4 per kw.-year when a 400,000 kw. unit is used. By going to larger units, the heating rate in B.t.u. per kwh. is also improved considerably, with further over-all gains in the cost

of rendering the service. For example, the annual cost per kw.-year, including fixed charges and operating and maintenance expenses, for a 50,000 kw. generating unit, is around \$34 whereas under similar conditions the corresponding cost for a 100,000 kw. unit is around \$25, for a 200,000 kw. unit it is about \$24 and for a 400,000 kw. unit it is \$20. Therefore, the economics of the industry as influenced by technological developments and larger generating units, are favorable and follow a sharply declining hyperbolic curve as the generating unit size is increased. Similar advantages are obtained by going to higher transmission and distribution voltages. All the wide-awake managers are taking advantage of these favorable economics.

Coming into more and more prominence are interconnections between neighboring systems. Such interconnections account for considerable investment savings through the pooling of reserve capacities. An added advantage of interconnected systems is that maintenance on units can be scheduled so as to assure proper continuity of service during maintenance periods for all participants.

CONSTRUCTION BUDGETS

Let us now cover briefly the electric industry's construction budgets. The industry as a whole, both government and investor owned, will add about 8½ million kw. of additional generating capacity in 1957. Retirements of old generating units will amount to about 400,000 kw., making the net increase in generating capacity about 8,100,000 kw. The generating capacity additions projected for 1958 are about 16,400,000 kw. This capacity will be added even in the event of a business recession because it generally takes about three years between the time a generating unit is ordered from the manufacturer and the time it is actually put on the line. On that account utilities must plan ahead. Also, additions to generating plants must be geared to the capacity of the manufacturers of generating units; so every company planning new capacity must place its order in time to get a position on the manufacturer's production schedule. Incidentally, the manufacturing capacity of the country for electric generating units is now about 15 million kw. and for 1958, or shortly thereafter, the manufacturing capacity will probably be increased to about 17 million kw. The manufacturing capacity for the required boilers is probably short of this figure and could cause delays.

Increased operating costs will force utilities to replace some of their older and less efficient generating units with more efficient equipment, as time goes on, in order to improve their economics. So investment in new generating capacity is likely to continue at a high rate for some years to come not only to replace older units but also to take care of the increase in load requirements. The utilities will also need sizable investments to strengthen their transmission and distribution facilities in order to take care of the increased consumption.

CAPITAL EXPENDITURES

For the industry as a whole, including government owned systems, the capital expenditures for 1957 will amount to around \$4.6 billion and corresponding expenditures in 1958 are estimated at \$5.3 billion. The investor owned electric

utilities alone will have capital expenditures of about \$3.6 billion in 1957 as compared with \$2.9 billion in 1956. In 1958 capital expenditures for the investor owned companies are likely to continue at the \$3.6 billion 1957 level but, in the event of a business recession, some of these expenditures could be carried over into 1959. Recent observations indicate that various managements are scrutinizing their construction budgets and are attempting to defer any items which are not absolutely necessary. This is a step in the right direction, particularly in a tight money market. Before the money market became tight and before interest rates went up, there was a tendency on the part of operating people to give annual construction budgets less scrutiny.

In this connection, particularly in selecting utility Commons, we must watch individual companies so as to make sure that their projected construction programs do not leave them with too much reserve capability, which, in turn, could adversely affect their earnings until such capability is finally utilized. In other words, some companies might find themselves temporarily in an over-built condition, which, because of the additional fixed charges resulting therefrom, might impair the net available for Common. For example, according to present plans, a certain company contemplates a 60% increase in net generating capability by the end of 1960. If this program is actually carried out, this company is likely to find itself by the end of 1960 with a reserve capability of almost 30% over its then peak load, or more than twice the size of the largest unit on the system. On the other hand, if the company were to defer one of its projected generating units, capital requirements would be cut by about \$20,000,000, future Common stock financing could be reduced substantially, and its per share earnings could show an increase to about \$3.30 to \$3.40 by 1960, without rate increases. If the planned unit is not postponed, the earnings potential by 1960 would be in the neighborhood of \$3.00 per share. This example illustrates the point, namely, that in selecting electric utility Commons it is important to guard against temporary over-capacity of the company involved.

Earlier in the year, estimates indicated that new money long-term financing of the investor owned electric utilities in 1957 would be about \$2.25 billion. This would be augmented by \$1.35 billion from internal cash generation. For the first nine months of this year the electric utilities raised \$1,716,000,000 through long-term financing compared with a little over \$1 billion for the corresponding 1956 period. In the first 9 months of 1957, the gas industry raised about \$656 million and the telephone industry about \$970 million, making a total of some \$3,342,000,000. The latter figure compares with only \$2,383,000,000 for the entire year of 1956.

Most of the substantial increase in new long-term financing had to be done in a tight money period but it was done without any serious difficulty.

The higher yields at which utility bonds have to be sold nowadays has raised questions in some investor's minds as to the desirability of putting new money into utility bonds rather than into Common stocks. Another question in the minds of some investors is whether these higher interest rates will not depress the utility industry's Common share

earnings. Of course one thing that should be recognized is that the purchaser is locked in, as to yield, at the purchase price of the bond, whereas the yield of a well selected Common is likely to increase through increased dividends as time goes on.

ALLOWABLE RATES OF RETURN

While not claiming competence on the subject, it seems that bond yields have probably reached their peak and it would not be surprising to see somewhat lower corporate bond interest rates by the latter part of 1958. Meanwhile, the recent increase in interest rates and in the cost of money generally may prove to be a blessing in disguise with respect to the utility industry. The point here is the influence of these higher money costs upon regulatory commissions in the over-all rate of return which is likely to be allowed as time goes on. In recent years regulatory commissions have been thinking in terms of allowable rate of return of 6% or less. Back in the 1920's when money costs were higher, rates of return as high as 8% were considered reasonable for electric utilities. Just as the rate of return went down with the low bond interest rates, so it is reasonable to expect that it will go up with them.

As a matter of fact, there are already many indications in that direction. For example, the Arkansas Public Service Commission some months ago allowed a 6½% rate of return to Arkansas Western Gas Company using as justification primarily the higher cost of money.

Even the California Commission, which has been considered among the strictest in the country, has adjusted the rate of return upward in a number of decisions during 1957, recognizing that "the present condition of the money market calls for revision of rates of return that might have been fair and reasonable when adequate funds at lower interest rates were available." It allowed a 6.9% rate of return on Pacific Lighting Gas Supply Company and a 7.13% return on Southern Counties Gas Company. These rates of return were calculated to permit the companies to earn a 6½% rate of return in the following year after a "trend allowance" for attrition. Similarly, the Commission allowed a 6½% return on the Monterey water properties of California Water & Telephone Company, as compared to a much lower rate of return allowed a few years back. In the most recent rate case involving Southern California Edison Company and decided on October 15, 1957, the Commission allowed a basic rate of return of 6¼%, which compares with a 5.9% basic rate of return allowed in the company's 1954 case. However, to the basic rate of return of 6¼%, the Commission, in effect, added a "trend allowance" of 0.12%, thus making a gross rate of return of 6.37%, which, in the opinion of the Commission, should enable the company to earn a basic rate of return of 6¼% in the future.

In a recent case involving Florida Power & Light Company, the Florida regulatory commission, in effect, allowed a 7% rate of return on the year-end rate base.

The New York Public Service Commission recently gave the New York Telephone Company a 6½% rate of return instead of the 6% granted in previous rate cases.

By and large, regulatory commissions throughout the

United States are sympathetic to the industry's needs for additional earnings. There are only a few states in which regulatory treatment has been stringent. The New England States, with the exception of Connecticut, are cases in point. For example, in Maine the fair value public utilities law was amended in 1957 and original cost was made the sole criterion for determining the rate base. Prior to this the State Supreme Court handed down a decision requiring that utilities be regulated on fair value, but the Maine Public Utilities Commission gave only a very small increment over original cost in subsequent decisions.

On the other hand, there are indications that the stringent policy followed by the Massachusetts Commission might be liberalized somewhat.

In New York, Governor Harriman called a special session of the legislature some months ago for the purpose of rescinding the fair value law under which telephone companies and railroads are supposed to be regulated in that state, but this attempt was defeated by the legislature.

Courts and regulatory commissions have been tending more towards fair value in recognition of the inflationary trend in construction costs. In that connection, it has been the Bell System and independent telephone companies which have fought for more realistic and equitable fair value rate bases. The Bell System is now confronted with considerable regulatory difficulties in Louisiana and Mississippi where the commissions have disallowed telephone rate increases in spite of the sub-normal rate of return now being earned even on the strictest rate base that may be devised. It is interesting to note that these two commissions have not instituted any rate reduction proceedings on electric and gas utilities which are now earning substantially higher rates of return than those now being earned by the telephone utilities. These electric and gas utilities are not earning excessive rates of return as measured by the usual standards applied by other commissions. It would seem that the Louisiana and Mississippi commissions are against rate increases as a general proposition at the present time, and those companies that are not seeking rate increases are not likely to have rate cuts imposed on them.

One recent favorable court decision from the investor's standpoint is that handed down by the Iowa Supreme Court in the Iowa-Illinois Gas and Electric Company case. The Court, in effect, took the position that, since construction costs have been going up over a long period of years and are likely to continue to do so, reproduction cost should be given much more weight than original cost in arriving at a fair value rate base. It thus promulgated that depreciated reproduction cost should be given a weight of 70% and depreciated cost should be given a weight of only 30% in arriving at fair value. The Court similarly prescribed that the annual depreciation rate, based on straight line depreciation, should be applied to the fair value rather than to original cost because it is the fair value that the company must recapture through its depreciation accruals. This is the first time that a court has recognized "economic" depreciation.

The Federal Power Commission has only limited jurisdiction over electric utilities as far as rate regulation is concerned and this covers only sales for resale, which are rela-

tively insignificant. This Commission has rate jurisdiction over natural gas pipeline companies and producers, and such regulation has been rather stringent. As is well known, the Federal Power Commission, in effect, has been putting a lot of weight, to say the least, on the so-called "cost of money" theory in arriving at rates of return, and the usual pattern has been an allowance of about 6% on a depreciated original cost rate base. Since interest rates on bonds and debentures and dividend rates on Preferreds have gone up sharply in recent months, a number of pipeline companies now have cases pending before the Federal Power Commission in which they are asking rates of return of 6½% to 6¾%. Due to the recent rise in the cost of senior capital, some pipeline companies may have to press for a 7% rate of return. Investors are waiting to see whether these justifiable high rates of return will be allowed.

PRICE RISE FOR ELECTRICAL SERVICE LESS THAN FOR OTHER ITEMS

Taking the period 1947-1949 as a base, it can be said that the average price charged per kilowatt-hour of electric service to the consumer has since gone up less than 7%, whereas prices of other things have gone up very substantially during the same period. One can easily visualize what would have happened to some of our strong and well managed industrial companies if they had to do business today at present costs but at prices only 7% above the 1947-1949 average level. Such comparison certainly is a tribute to the electric utility industry. It would seem therefore that, in all fairness, those electric utility companies which need rate relief should have no difficulty in obtaining it. The fortunate thing in this connection is the fact that such rate relief as is required will be relatively nominal—probably less than 10% in most cases. Another fortunate thing is that rate increases of this relatively small magnitude are bound not only to offset the increase in costs of doing business, including the higher cost of money, but will at the same time increase the per share earnings appreciably.

The higher rates of return which are being allowed by the regulatory commissions as a result of the present higher cost of money will improve substantially the earnings per share of Common. Take, for example, Commonwealth Edison Company. In March, 1957, the company sold \$50 million First Mortgage 4½% bonds. Prior thereto the company had outstanding about \$460 million bonds, so this is a typical 1-year senior financing at about 10% of the debt previously outstanding, which, in turn, is in line with the average growth of a utility company. As compared with the 4½% new bond money, the weighted average interest on the previously outstanding debt was about 3.26%. Thus, the increase in the cost of the new bond money was about 1% and this, in turn, net of income taxes, amounts to less than 1½c per share. Even if the company had to sell these bonds later this year, where the increase in the cost of its bond money would have been, say, 1½%, such increase, net of income taxes, would have been equivalent to a little over 2c per share. On the other hand, this company, on July 23, filed with the Illinois Commerce Commission for an increase in electric rates averaging about 7½% and aggregating about \$25 million on an annual basis. In this rate

increase application, the company, in effect, is asking for the equivalent of about 6½% on total capitalization, which apparently is well within the fair value rate base concept applicable in Illinois. The requested rate increase if granted in full, will add, net of taxes, about 60c to the per Common share earnings after offsetting the higher cost of the recent financing and the higher costs of doing business.

The longer term outlook for the electric utility industry is favorable. Growth in kilowatt-hour sales should average at least 6½% compounded annually during the next 15 years. While there may be temporary ups and downs, in line with economic conditions, the long-term growth curve is upward; the electric utility industry is, decidedly, a growth industry.

There are many reasons for this growth, including population increases and an increase in the rate of family formations. Between now and the early 1960's there will be a decrease in the rate of family formations due to the decrease in the birth rate during the last depression but after the early 1960's the rate should resume its upward trend when the bumper crop born in the wake of World War II will be forming new family units. This will mean a sharper increase in number of customers.

NEW USES FOR ELECTRIC SERVICE

There will be many new uses for electric service in the home. The heat pump will undoubtedly come into greater acceptance as time goes on. This is a rather important load-building device. For example, if we were to achieve a heat pump saturation of only 5%, the residential kilowatt-hour sales would increase more than 30% and the corresponding increase in residential revenue would amount to more than 20% from this device alone.

Industrial power consumption will show very substantial increases in the next 10 to 15 years because of the continued mechanization of industry in order to offset rising labor costs. From the middle 1960's on, the age distribution of population will be very favorable toward the development of additional electric service. Growth of population will be in the younger and older age brackets, while the in-between bracket, which provides the labor force, will show a shrinkage. This means more mechanization and automation and consequently greater consumption of electric service in order to augment the available labor force and provide the necessary output for satisfying demand for continued improvement in this country's standard of living.

The population shifts to the suburbs are bound to provide a steady increase in residential and commercial customers for electric utilities. This population shift to the suburbs will be accelerated, as time goes on, by the new state and Federal highway construction program. More and more competition for the consumer's dollar will induce merchants to use more modern store lighting, air conditioning, and other electrical equipment.

Considering the many new uses for electric service, it is

not inconceivable to visualize an average residential consumption of 15,000 kilowatt-hours per customer annually by 1970 as compared with a similar annual consumption of only 3,180 kilowatt-hours in 1957.

The substantial growth in kilowatt-hour sales expected for all classes of service, together with the favorable cost curve of the electric utilities previously discussed, is bound to be translated into favorable earnings. The industry should be able to finance this expansion without difficulty and maintain a sound capital structure. Selected electric utility Common stocks will be rewarding over the long term. The industry may now be in a phase where earnings growth per share will temporarily be somewhat less vigorous than in the recent past, but over the longer term the well established growth characteristics will correct this temporary situation.

PROPERLY SELECTED ELECTRIC UTILITY COMPANIES GOOD INVESTMENT

Due to higher interest rates and other factors, electric utility Commons have recently become less fashionable in some investment quarters. It is our opinion that properly selected electric utility Common stocks, in the light of good yields now afforded, plus anticipated increases in per share earnings and dividends as time goes on, provide a good investment medium, particularly from the standpoint of a defensive position in the present unsettled market and uncertainties as to the trend of the country's over-all economy. Relatively speaking, electric utility Common stocks have not performed badly during the current market decline.

YALE & TOWNE

Declares 280th Dividend

37½¢ a Share



On Jan. 23, 1958,
dividend No. 280 of
thirty-seven and one-half
cents per share was
declared by the Board
of Directors out of
past earnings, payable
on April 1, 1958,
to stockholders
of record at the close of
business Mar. 13, 1958.

WILLIAM H. MATHERS
Vice-President and Secretary

THE YALE & TOWNE MANUFACTURING CO.
Cash dividends paid in every year since 1899

Columbia Gas continued to grow in 1957

Highlights of the Year

Earnings... Net income reached an all-time high of \$30,453,000.

Gross Revenues... A new record of \$376,075,000 was established, marking ten consecutive years of increased sales.

House Heating... The System served at retail 66,000 additional house-heating customers — a total of 1,107,000.

Consumption... Average consumption per residential customer was 153.8 Mcf, up 19% since 1952.

Reserves... Columbia initiated programs for Louisiana exploration and deep-well Appalachian drilling.

Hydrocarbons... Columbia Hydrocarbon Corporation was formed to extract heavier hydrocarbons from rich gas streams in Kentucky and West Virginia.

Automation... To improve efficiency and economy, the System added automatic and electronic equipment in transmission, distribution and accounting.



Throughout its service territory — Ohio, Pennsylvania, West Virginia, Kentucky, Virginia, Maryland and southern New York — natural gas continues to be the *preferred fuel* for home and industry. To learn how Columbia is meeting the ever-increasing natural gas requirements of this vital area, write for your copy of our Annual Report.

THE COLUMBIA
Gas SYSTEM, INC.
COLUMBIA GAS SYSTEM SERVICE CORPORATION
COLUMBIA HYDROCARBON CORPORATION
120 East 41st Street, New York 17, N.Y.

CHARLESTON GROUP: United Fuel Gas Company, Amere Gas Utilities Company, Atlantic Seaboard Corporation, Columbia Gas of Kentucky, Inc., Virginia Gas Distribution Corporation, Kentucky Gas Transmission Corporation...
COLUMBUS GROUP: The Ohio Fuel Gas Company, The Ohio Valley Gas Company...
PITTSBURGH GROUP: The Manufacturers Light and Heat Company, Columbia Gas of New York, Inc., Cumberland and Allegheny Gas Company, Home Gas Company... THE PRESTON OIL COMPANY

High Prices Hidden by Stock Splits

HARRY D. COMER

FRANK W. WOOLWORTH's original 5-and-10-cent principle (that people have more nickels and dimes than dollars) appears to be working in the stock market. Somehow, a low price has an appeal all its own. Lowness of price is frequently confused with cheapness.

Recently a client asked if Bethlehem Steel did not look cheap "at 40." On being reminded that Bethlehem stock had been split 12-for-1 since the war, and that a price of \$40 now is equivalent to \$480 per share for the stock which was priced around \$75 at the end of the war, he said he had forgotten about the splits. Many stocks now in the "lower brackets" are there because of a stock split or a series of splits. The split hides an actually high price, in some cases fantastically high.

Aluminium Ltd. has been split 30-for-1 since the war. The recent bull market high was 53 1/8 for the present shares. That is equivalent to \$1,594 for a single 1946 share. Even the 1949 low of 5 1/8 was equivalent to about \$176 per 1946 share.

Outboard Marine has been split more than 10-for-1. The

present stock (equivalent) which sold for \$1 per share in 1949 rose to 37 3/8 at the bull market top. Stated in terms of pre-split stock, this rise was from 11 to 404, a gain of \$393 per share, or over 3500 per cent.

"*Nickel Plate*" Railroad has been split 10-for-1 since the war. The present stock (equivalent), which sold for 5 1/8 per share in 1949, rose to 34 1/4 at the 1956 peak. Stated in terms of pre-split stock, this rise was from \$51 to \$342.

International Business Machines has been split nearly 7-for-1 since 1946. The recent bull market high was 367 1/2 for the present shares. That is equivalent to a price above \$2,500 for a single 1946 share. Even the 1949 low of 36 5/8 was equivalent to about \$250 per 1946 share.

Adjacent table lists significant data about these and other leading stocks which have been split 6-for-1 or more since the war. But for such splits, all of these stocks recently would have been selling at prices which look like "telephone numbers." (See second column from right in table.)

Stock-split Ratio, Since 1946**	STOCK	PRICES PER SHARE				
		Present Stock		1946 Shares*		
		1949 Low	1955-57 High	1949 Low	1955-57 High	
30-for-1	Aluminum, Ltd.	5-7/8	53-1/8	176	1594	804%
12-for-1	Dow Chemical	14-1/4	82-7/8	171	995	481
12-for-1	Bethlehem Steel	5-3/4	50-5/8	69	607	780
10.8-for-1	Outboard Marine	1	37-3/8	11	404	3637
10-for-1	Atchison, Topeka & Santa Fe	8	34-5/8	80	346	332
10-for-1	Union Pacific R.R.	14-5/8	41	146	410	180
10-for-1	"Nickel Plate" R.R.	5-1/8	34-1/4	51	342	568
10-for-1	Container Corp.	2-1/2	23-3/4	25	237	850
9-for-1	Monsanto Chemical	15-1/4	52-5/8	137	474	245
9-for-1	Square D Co.	4-3/8	35-3/4	39	322	717
8.33-for-1	Dana Corp.	9	61	75	508	578
8-for-1	Amerada Petroleum	22-3/8	147-1/2	179	1180	559
8-for-1	Minn. Mining & Mfg.	8-1/4	101	66	808	1123
7.5-for-1	Lone Star Cement	8	40-1/8	60	301	401
7.5-for-1	Clark Equipment	5-1/2	75-1/2	41	566	1273
6.84-for-1	International Business Machines	36-5/8	376-1/2	250	2575	928
6-for-1	Boeing Airplane	3	65-3/8	18	392	2079
6-for-1	Douglas Aircraft	8-1/8	95-5/8	49	574	1077
6-for-1	General Motors	8-5/8	54	52	324	526
6-for-1	Goodrich	8-3/4	89-1/4	52	535	920
6-for-1	Houston Lighting	14-1/8	60-7/8	85	365	331
6-for-1	Ingersoll-Rand	18-3/8	88-1/2	110	531	381
6-for-1	Johns-Manville	15-1/4	58-3/4	91	352	285
6-for-1	McGraw Hill	4	50-1/4	24	301	1156
6-for-1	Merck & Co.	9	44	54	264	389
6-for-1	Standard Oil, N. J.	10	68-1/2	60	411	585
6-for-1	U. S. Steel	10-1/8	73-3/4	61	442	628

*Value, at dates shown, for an original 1946 share, adjusted for splits; computed in all cases by multiplying prices shown in "Present Stock" columns by "Stock-split Ratio" shown in left-hand column.

**Number of shares an investor would now hold for each share held at beginning of 1946. In these computations, distributions less than 6-for-5 are ignored.

Dates of Splits

Aluminum, Ltd.: 5-for-1 ('48); 2-for-1 ('52); 3-for-1 ('57).
 Amerada Petroleum: 2-for-1 ('46); 2-for-1 ('51);
 2-for-1 ('55).
 Atchison, Topeka & Santa Fe.: 2-for-1 ('51); 5-for-1 ('56).
 Boeing Airplane: 3-for-2 ('52); 2-for-1 ('54); 2-for-1 ('56).
 Bethlehem Steel: 3-for-1 ('48); 4-for-1 ('57).
 Clark Equipment: 2-for-1 ('47); 3-for-2 ('52); 5-for-4 ('51);
 2-for-1 ('56).
 Container Corp. of America: 2-for-1 ('50); 5-for-4 ('54);
 4-for-1 ('56).
 Dana Corp.: 3-for-1 ('46); 5-for-3 ('47); 5-for-3 ('49).
 Douglas Aircraft: 2-for-1 ('51); 2-for-1 ('54); 3-for-2 ('55).
 Dow Chemical: 4-for-1 ('47); 3-for-1 ('52).
 General Motors: 2-for-1 ('50); 3-for-1 ('55).
 Goodrich: 3-for-1 ('51); 2-for-1 ('55).
 Houston Lighting & Power: 2-for-1 ('47); 3-for-1 ('51).
 Ingersoll-Rand: 2-for-1 ('48); 3-for-1 ('54).
 International Business Machines: 5-for-4 ('46); 7-for-4 ('48);
 5-for-4 ('54); 5-for-4 ('56); 2-for-1 ('57).
 Johns-Manville: 3-for-1 ('47); 2-for-1 ('56).
 Lone Star Cement: 3-for-1 ('51); 5-for-2 ('56).
 McGraw Hill Publishing: 2-for-1 ('53); 3-for-1 ('56).
 Merck & Co.: 2-for-1 ('49); 3-for-1 ('51).
 Minnesota Mining & Mfg.: 4-for-1 ('51); 2-for-1 ('56).
 Monsanto Chemical: 3-for-1 ('46); 3-for-1 ('55).
 New York, Chicago & St. Louis R.R. ("Nickel Plate"):
 5-for-1 ('51); 2-for-1 ('56).
 Outboard Marine: 6-for-5 ('53); 3-for-1 ('53); 3-for-1 ('57).
 Square D Co.: 3-for-1 ('46); 3-for-1 ('56).
 Standard Oil, N. J.: 2-for-1 ('51); 3-for-1 ('56).
 Union Pacific: 2-for-1 ('48); 5-for-1 ('56).
 United States Steel: 3-for-1 ('49); 2-for-1 ('55).

* * *

The above study carries back only through 1946. If splits are calculated back through the late 1920's, it is found that many issues were split from 12-for-1 to over 100-for-1. Some examples follow, a few of which, as footnoted, run back somewhat further than 1929.

**SOUTHERN
NATURAL GAS
COMPANY**
Birmingham, Alabama

Common Stock Dividend No. 76

A regular quarterly dividend of 50 cents per share has been declared on the Common Stock of Southern Natural Gas Company, payable March 13, 1958 to stockholders of record at the close of business on February 28, 1958.

H. D. McHENRY,
Vice President and Secretary.

Dated: January 25, 1958.



THE FLINTKOTE COMPANY

New York 20, N. Y.

QUARTERLY DIVIDENDS
have been declared as follows:

Common Stock*
sixty cents (\$.60) per share
\$4 Cumulative Preferred Stock
one dollar (\$1) per share

Both dividends are payable March 15, 1958 to stockholders of record at the close of business February 19, 1958.

WILLIAM FEICK, JR., Treasurer
February 5, 1958.

*118th consecutive dividend



**COMMON STOCK
DIVIDEND**

The Board of Directors of Central and South West Corporation at its meeting held on January 16, 1958, declared a regular quarterly dividend of forty-two and one-half cents (42 1/2¢) per share on the Corporation's Common Stock. This dividend is payable February 28, 1958, to stockholders of record January 31, 1958.

LEROY J. SCHEUERMAN
Secretary

**CENTRAL AND SOUTH WEST
CORPORATION**
Wilmington, Delaware

Crumbs for Stockholders

EDWARD L. BARNES

THE BULK OF THE MONEY DISGORGED by corporations flows to labor and tax collectors—not to stockholders, the owners.

One of the great delusions of the day is that corporate profiteering induced our inflationary troubles. To believe that parasitical practices by business management caused the twenty-year decline in the purchasing power of the dollar is to believe that the tail can wag the dog.

Total dividends distributed by all corporations are but a speck (less than four per cent) in the maze of statistics known as national income.

A RECENT POLL

A recent poll found that: "Sixty-four per cent of all employees and fifty per cent of the public, feel that the owners of business concerns get too much and that the employees get too little."

Quest of the almighty dollar is as keen on the part of investors as by labor leaders and tax collectors, but the popular impression that stockholders bleed corporate treasuries and are a mercenary lot is indisputably refuted by official statistics. The real extortioners are organized labor and government. Stockholders get only pin money although they assume all the risks and supply the sinews of industry without which there would be no jobs, or earning power to tax.

Ford Motor Company, for example, paid its stockholders (owners) \$129,568,000 in 1956 whereas its payroll totaled \$1,191,530,000 while its bill for federal income taxes was \$242,000,000. Ford's total consolidated provision for taxes, including United States manufacturers' excise taxes, was \$647,000,000.

Ford Motor Company has about as many men and women on its payroll as there are residents in a city the size of Hartford, Connecticut. The sustaining force for this army of workers consists of the investors who had the foresight, courage and energy to create, expand and perpetuate the business which now has at risk a total of perhaps nearly three billion dollars in assets.

It is the prerogative of management to determine the size of dividends, but not in relation to capital investment or net worth or to percentage of sales. Management's discretion is narrowed down to the balance remaining after Government has decreed how much it shall take and after labor has by fair means or foul pried all it can from the employer.

SMALL CASH FLOW TO STOCKHOLDERS

The cash flow to stockholders is pathetically small in comparison with the contribution they make to a more abundant life. Fulminations of labor chiefs and hypocritical politicians apropos excessive profits and dividends are a smokescreen for their own covetousness.

Fruehauf Trailer Company in 1956 rewarded its stock-

holders with \$8,492,000 in cash dividends, but in the process of this feat it distributed \$71,691,000 to its workers and government. In the latter part of 1957 the company was forced to omit dividends, but wages and taxes continue.

When a union boss complains that a company is making ten per cent or twenty per cent on its net worth and therefore should cut prices to consumers and increase wages, labor has not put its finger on revealing or significant data. Only the compulsions of competition can apportion the pie, which is as it should be. Yet there is a constant undercurrent of propaganda that capital is the malevolent creature in our midst, devouring profits and gathering in the lion's share of production. To dispel this illusion one has only to study the official figures.

Payrolls of the Borden Company in 1956 amounted to \$164,966,000 while federal income taxes were \$20,951,000. The total sum going to Uncle Sam and labor was \$185,917,000. Stockholders got \$13,216,000. Whether dividends happen to be three per cent or fifty per cent on net worth, the fact remains that labor and government captured fourteen times more money from the business than the owners.

THE FORGOTTEN MEN

In the economic battle for who gets what and how much, the stockholders are the forgotten men—inarticulate, unorganized, out-maneuvered and overwhelmed by superior force.

The organization, or the system, or the management which made possible the flow of \$185,917,000 to Borden employees and government in a single year could not endure without that tiny spark of reward represented by dividends, or without the colossal amount of capital invested in plant and equipment.

Select at random from the Stock Exchange list any group of corporations in which there is widespread public interest and ownership, it will be found that whether weak or strong corporations are examined; whether representing prosperous or depressed industries, the stockholder is a small frog in a big pond. The threat is that endless wage and fringe benefit demands combined with ceaseless political pressure for more spending and taxing will drain the pond and kill the frog.

Immoderate demands by selfish interests upset the harmony of the body politic. As Aristotle said, ". . . when by law carried to excess one or other element in the state is ruined, the constitution is ruined."

American Brake Shoe distributed in 1956 cash to its stockholders amounting to \$4,129,000, but why begrudge this money to investors considering that they created and preserve an organization which paid \$67,008,000 to labor and the United States Treasury? Of the total sum going to the three classes of recipients, stockholders got less than six per cent. Clearly, the owners of big business are not enriching themselves at the expense of others.

Perhaps the reader is thinking that profits of American Brake Shoe were much larger than dividends. Fortunately, they were, the reported figure being \$8,963,000, but the management made capital expenditures of \$8,044,000 or substantially in excess of depreciation allowance. Only by plowing back in new or enlarged plants, modern equipment and scientific research can a business stay alive and provide jobs for additional workers in the years to come.

Allegheny Ludlum Steel Corporation in 1956 distributed only \$6,382,000 to its stockholders, whereas the flow of cash to its workers and the government was eighteen times the sum going to shareholders. The \$122,300,000 paid labor, government and stockholders was possible because investors combined their savings to erect plants, supply tools, buildings and equipment valued at \$78,645,000 net after depreciation, depletion and amortization. Well paid jobs would not be available except for the physical facilities resulting from invested capital and the forbearance of management and stockholders in not grasping at every dollar earned by the business.

When International Shoe Company met its payroll of \$116,640,000 in 1956, the employees acquired eighty-five per cent of the corporation's outgo to owners, government and workers. Taxes and payroll costs were sixteen times the sum distributed to stockholders.

CIRCUMSTANCES DETERMINING PARTITION OF EARNINGS

The partition of corporate earnings is determined by many circumstances beyond the control of directors. The federal government, States and local taxing authorities decide and legislate their share of the pie. Labor's portion is extracted, in part at least, under duress, threats, strikes and by virtue of the monopoly and other powers conferred on unions by government. Stockholders, the owners, come last and divide what is left, but only after prudent management sets aside reserves for future growth and plant expansion.

Were it not for the foresight, discretion and courage of business management in withholding from stockholders for future expansion and emergencies an adequate portion of profits, our economy would be in desperate position indeed. Taxes must be paid, wages must be paid. Dividends are declared only if, as and when anything remains. In working for a progressive and solvent future, responsible corporate executives must sacrifice dividends and stockholders whenever cash drops to a danger level.

National Steel Corporation paid income taxes in 1956 of \$47,000,000; dividends of \$29,568,000 and payroll of \$177,000,000. In this case labor and tax costs were nearly eight times the share distributed to shareholders.

The triumvirate of government, labor and capital has degenerated into a contest unfair to stockholders. The rights of taxing authorities and the rights of labor unions are spelled out and may be enlarged at any time without concurrence of stockholders.

TAXES & WAGES TAKE LARGE SHARE OF EARNINGS

Taxes and wages have been gaining on dividends for many years. Back in 1939 American corporations were

paying more in dividends than in taxes, but by 1956 income taxes on corporate earnings were nearly twice the sum distributed to stockholders. Compensation of employees jumped from twelve times dividend payments in 1939 to about twenty times dividends in 1956.

As the rewards of ownership slump to a smaller and smaller percentage of the emoluments flowing to jobholders and tax collectors, national interest in maintaining private enterprise is undermined. Basis exists for genuine satisfaction in achievements of the American economy in making higher wages possible. Why begrudge higher returns to the owners of business? To continue the anti-profits trend is to extinguish the dimming light of individual ambition and endeavor.

The railroad industry is in a particularly bad way because of the limited financial fare it can feed stockholders. Small wonder the railroads have difficulty in attracting capital and a wider group of owners. Payrolls and taxes were \$6,440,000,000 in 1956 contrasted with aggregate cash dividend payments of \$444,909,000. For every dollar of dividends fourteen dollars went to labor and taxing authorities. Even if labor had gone whole-hog and acquired the dividends, wages of the industry would have been increased by only 8.3 per cent.

Public utility stockholders are confronted with much the same problem as industrial or railroad stockholders. The Columbia Gas System in 1956 spent \$50,019,000 on payrolls and benefits while all taxes totaled \$42,886,000. In comparison with the more than ninety million dollars distributed in wages and taxes, the \$18,544,000 disbursed to stockholders is a small item which is even smaller when related to net plant and property carried at \$645,000,000. The tools provided by investors made for less human effort and increased productivity and leisure. Wide public realization of the interdependence of wages, taxes and dividend is a prerequisite to more constructive political and labor leadership as it pertains to corporate fiscal problems.

Wage and tax costs of Blaw-Knox Company in 1956 were 46.5 times the \$1,891,000 in dividends stockholders received for the use of their money invested in the business. On the other hand, American Home Products Company enjoyed wage and tax costs which were less than five times dividends. Is a company unfair to labor or is it contributing to inflation because invested capital is employed so efficiently it can outperform other concerns?

Try as hard as ideologists will to standardize the fruits of productivity, their efforts are defeated by the peculiarities of the products manufactured or the services rendered; by the variations in the amounts of invested capital involved and by technological and scientific discoveries. Capital investment of \$5,000 per jobholder may be adequate in one industry whereas another will require \$30,000—a point to bear in mind in observing the diversity of dividend totals as contrasted with wages.

In a free economy which has made America the industrial miracle of the world, the beneficiaries are legion, but as groups they cannot be expected to partake share and share alike. However, this is no reason to push purveyors of capital to the wall by unfair representations that profits or dividends are excessive and sinister.

Monsanto Chemical Company with gross property investment of more than seven hundred million dollars distributed only \$20,992,000 to its owners in 1956. Employes and taxes consumed \$141,000,000. Perhaps wages should have been higher, but the point is that as wages grow, as the spending stream is enlarged and as an increasing army of jobholders adds to consumer buying, it is only equitable that stockholder income grows or at least holds its position relative to the take of workers and government. This has not happened in the last twenty years or more, viewing wages, taxes and dividends as a whole. Instead, owners have been served smaller pieces of pie. Probably this has considerable to do with the shortage of investment capital which assumed critical proportions in 1957 and helped force up money rates.

Study of the 1956 annual statements of corporations pro-

vides a wealth of evidence that, contrary to popular opinion, stockholders are not the big beneficiaries of "excessive" profits or prices as implied by charges of certain labor chiefs. Not long ago the automobile industry was urged by a union official to cut "exorbitant" prices, but nothing was said about the failure of dividends to keep pace with the increase in all other segments of the economy.

PROSPERITY HINGES ON RISK CAPITAL

National growth and prosperity hinge on the risking of billions of dollars each year in new products and methods. The incentive to accumulate capital and pour it into venture channels is in danger of being killed by public apathy or ignorance of the fact that stockholders are living on the crumbs which remain after powerful predatory interests have feasted.

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Dividend No. 54

Interlake Iron Corporation has declared a dividend of 95 cents per share on its common stock payable Dec. 16, 1957, to stockholders of record at the close of business Dec. 2, 1957.



J. P. Flanagan
Exec. Vice Pres. & Treas.

Interlake Iron CORPORATION CLEVELAND, OHIO

Plants: Beverly, Chicago, Duluth, Erie, Jackson, Toledo

Harbison-Walker Refractories Company

Board of Directors has declared for quarter ending March 31, 1958, DIVIDEND of ONE and ONE-HALF (1½%) PER CENT or \$1.50 per share on PREFERRED STOCK, payable April 21, 1958, to shareholders of record April 3, 1958.

Also declared a DIVIDEND of \$.45 per share on COMMON STOCK, payable March 3, 1958, to shareholders of record February 13, 1958.

G. F. Cronmiller, Jr.
Vice President and Secretary

Pittsburgh, January 30, 1958.



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- Agriculture
- Petroleum
- General Industry and Government

with...

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- Leaf and Mechanical Springs
- Bumpers—Cushion Springs
- Brakes—Forgings—Stampings
- Gratings—Universal Joints

DIVIDEND NOTICE

The Board of Directors has today declared a regular quarterly dividend of fifty cents (50c) per share on the Common Stock of the Company, payable March 10, 1958, to stockholders of record at the close of business February 18, 1958.

A. A. Finnell, Secretary
January 27, 1958

ROCKWELL SPRING AND AXLE CO.
Coraopolis, Pennsylvania

American-Marietta

in 1957... Another Year

Achieved record sales of \$234 million . . . \$32 million more than in 1956.

Increased net income to \$17,182,701 . . . the largest in Company's history and 6% above the previous fiscal year.

Earned \$2.21 per Common Share, exclusive of Class B Shares.

Split common shares on 3 for 2 basis. Shareowners received one additional share for each two held.

Raised Common Share dividend income by 25% after stock split. 1957 dividends totalled \$6,823,696 compared with \$4,934,502 for previous year.

Attained a net worth in excess of \$100 million.

Increased working capital by \$10,791,348 to an all-time high of \$44,766,863.

Entered printing ink field through acquisition of Sinclair and Valentine Company with 48 plants.

Acquired Guardite Company . . . a leading producer of equipment for environmental testing and tobacco processing.

Expanded facilities and markets of Adhesive, Resin and Chemical Division through purchase of Booty Resineers.

Added 1,500,000 barrels to annual cement capacity by building of new production facilities.

Increased lime capacity and operational efficiency at several locations.

Extended concrete products operations into areas not previously served.

Shipped a record amount of concrete pipe and pre-stressed bridge sections from enlarged facilities.

Benefited from improved depletion allowance basis applying to raw materials used in cement production.

Had an increase in Shareowners from 21,467 to 27,923.

of
Solid Growth

Reinvestment of sizeable amounts of earned income has contributed to American-Marietta's progress and has resulted in substantial increases in dividend income for owners of Common Shares.



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The Decline of the American Woolen and Worsted Industry

SEYMOUR HIMMELSTEIN

THIS ANALYSIS OF THE DECLINE of American wool manufacture attempts to provide a comprehensive and integrated picture of a significant industry whose recent history should be of considerable interest. Only partial written treatment of the intricate problems of the woolen and worsted industry has been available heretofore.

The American woolen and worsted industry for the first century and a third after the establishment of its first real mill passed through the stages of incubation, experimentation and sporadic progress, accelerated growth, and, finally, industrial maturity. Even though some signs of difficulty had appeared in the 1890-1920 period, a sustained decline did not begin until five years after the First World War. This drop continued and, fundamentally, was halted only by the unusual circumstances that characterized World War II and the three years that followed, and later by the initial year of the Korean hostilities. Then production nose dived, huge financial losses were suffered, and a tremendous wave of mill liquidations took place. Since the beginning of 1955 some improvement in conditions has occurred, but a substantial proportion of the companies in the drastically shrunken industry are far from secure.

ALTERED CONSUMER BUYING HABITS

Significantly contributing to the contraction of wool manufacturing was the decrease in the relative role of clothing in the consumers' budget. The altered buying habits of the American public, influenced by such basic factors as higher incomes and living standards, the impact of the World Wars, the increase in available leisure time, changes in the locational and age composition of the population, and the development of new enticing consumables, relegated apparel to a less important position.

Probably the most significant single explanation for the decline in woolens and worsteds was the successful competition of other textile fibers, especially those chemically produced. Rayon and acetate products made sizeable inroads into traditional wool lines, but the really devastating damage was wrought by the polyester and acrylic staple fiber fabrics, in pure and blended forms. The competition from the synthetic fiber goods and from certain other textiles rested upon price and quality considerations, with the special properties of the newer fibers particularly appealing to the public.

SOUTHERN MILLS

Within the woolen and worsted industry the role of the Southern mills has increased markedly at the expense of the plants in New England and the Middle Atlantic States.

The inter-regional rivalry has been intense and has tied in largely with the problems of labor organization and labor cost. In few manufacturing fields have the social, economic and political differences between the North and South resulted in such extreme competition.

IMPORTS

Fabric imports have been an increasingly important factor in recent years, for the most part competing with the better quality woolens and worsteds, which have not been appreciably replaced by the synthetics. Another contributing factor to the decline in wool manufacture was the impact of excessive productive capacity upon this relatively competitive industry. Also significant was the removal of the potent stimuli created by World War II and the early part of the Korean hostilities which brought about the reassertion of the essential downward trend of the industry.

The problems of the distressed areas resulting from the contraction in wool manufacture have been serious. Various measures to aid such communities have been evaluated by the writer, who consequently advocates a more comprehensive approach than that currently being applied.

RETRENCHMENTS BY CORPORATIONS

The means employed by individual wool textile corporations to survive in the face of difficult conditions have been diverse. Wage cuts have been resorted to, as have various forms of retrenchment. There has been a trend toward diversification to guard against the vicissitudes of consumer demand.

What major developments in the woolen and worsted industry can we expect? Competition from synthetics should no longer present the same threat that it represented in the past. Experience since 1955 indicates that a greater balance is being achieved in the textile industry between the natural and synthetic fibers, and that the large-scale incursions of the past will recur with less frequency in the years to come. The import problem, which has been somewhat circumscribed by a tariff-quota policy first instituted in the last quarter of 1956, can not be expected to reach the magnitude foreseen by some industry pessimists. The most important development will be the continued shifting of the industry to the South (despite the Fall 1956 wage increases in that region), particularly with regard to the production of more standardized yarns and cloths. In the absence of powerful counterforces, the overwhelming proportion of the industry's output within a relatively small number of years is likely to come from below the Mason and Dixon Line.

Book Reviews

PROSPERITY WITHOUT INFLATION

Arthur F. Burns
The Moorehouse I. X. Millar Lectures
Fordham University Press, N. Y.
88 pp., \$2.00

These four lectures are the first of an annual series to be presented by Fordham University in honor of Moorehouse I. X. Millar, S.J., "to promote the common good."

Arthur Burns has succeeded in defining the forces governing our industrial welfare. Analysts studying this short book with care will come closer to understanding the importance of controlling inflation and insuring the direction of market trends by stable prices.

Governmental checking of inflation is not always well received. Yet it is the slowly rising price level that weighs heavily on enterprise and forces unemployment. In the early period of inflation "even mild measures on the part of government can be effective." Planning is important, as is the coordination of all our agencies.

Sound price level must be influenced by our monetary policy. Although credit restraints are never popular, "The Federal Reserve System can exercise a decisive influence on the level of reserves." But they too must be guided by a consideration of that which the government is endeavoring to accomplish.

The rights of small business, the impact of Treasury financing and the general credit controls are examined and discussed. One wonders how so much can be compressed into few pages. A single reading will hardly be enough. One might do well to read the last lecture first, and then reread it after acquiring a greater familiarity with the facts contained in the first part of the book.

It is by a broad approach to the problem of inflation that it may be restrained, for stable prices and employment are not incompatible. They should and can evolve together. How to attain this will become clearer after examining and considering the facts and possibilities suggested. "The economic future of America depends largely on what we make of our opportunities."

In this department are summarized books, articles, and documents of outstanding economic or financial interest.

Helen Slade is the author of the book reviews. She will cooperate with members of the Society desiring source material for JOURNAL articles and for research projects and studies.

THE ECONOMIC ALMANAC 1958

The Conference Board Fact Book
Published for the Conference Board
by Thomas Y. Crowell Company
673 pp., \$5.00, 800 tables

This source of economic data is compiled annually by the research staff of the National Industrial Conference Board. It contains answers to questions required by analysts on such subjects as prices and their trends, banking and finance, and most material essential for forecasting.

Assets and liabilities of the twelve Federal Reserve Banks are set forth in excellent tables. Other tabulations cover transportation, communications, construction, manufacturing, trade, etc.

Careful research by the Board's large organization has made this book possible. The revised 1958 Almanac contains new statistical estimates and significant information. It is concisely presented, and will be welcomed by numbers of students and persons engaged in financial research.

BANK STOCK PRICES AND THE BANK CAPITAL PROBLEM

David Durand
National Bureau of Economic
Research, 68 pp., \$1.00

The reason for bank stocks selling at lower than their book value is the real question of this study. It is likely that "earnings are at the basis of the prob-

lem of bank capital." The authors lean heavily on results obtained through multiple regression as a useful gauge to our understanding of the bond market. Emphasis is laid on weights, since they may prove a satisfactory tool for analyzing financial problems and appraising individual securities. The explanation of this can be of tremendous value to most analysts.

The table showing weights obtained of over a hundred stocks, indicating the relative importance of book value, dividends, and earnings as factors influencing bank stock prices, should be equally helpful if used in other fields of investments. This is especially true where a maximum return is desired with safety and growth. The estimate of the merit of bank stocks with or without adequate bank capital opens an entire new manner of appraisal few investors can overlook.

HOW TO RUN A SUCCESSFUL INVESTMENT CLUB

Raymond Trigger
Harper & Brothers
115 pp., \$2.75

A great interest has developed in Investment Clubs, so this book telling how they function comes as an answer to a growing need. More and more buyers of securities are making purchases through clubs and in some parts of the country this kind of investing has come to be the most favored. Clubs are a means for extensive ownership of the nation's wealth. Moreover, far-reaching economic interest develops from participation in investment decision.

Usually a committee is assigned to evaluate shares, although much of this is done under the supervision of a broker or advisor. Certain members are given the duty of collecting data from source material. Where this may be found, is listed and will be of value. Doubtless some who are buying on their own may find it a welcome record.

The author, a student of club investing, has written numerous articles on the subject and given guidance to young organizations.

VANTAGE STOCKS

R. H. Weber and Thomas B. Meek
Business Reports, N. Y.
142 pp., \$10.50

"One can never judge a book by its cover" is an old, true saying. This is one of the reasons that reading "Vantage Stocks" holds pleasant surprises. It is one of the most valuable investment books that have been published. Each page, in fact every thought therein expressed, confirms this impression.

Vantage stocks are more than growth stocks. For growth shares seem generally to be considered those whose worth and asset value appreciates more rapidly than does that of the aggregate list. Vantage stocks should put their owners in a "superior or more favorable position." This may be brought about by a long term of satisfactory development, coupled with flourishing dividends, enabling the income from them to keep in step with the cost of living.

Another advantage lies in good direction. According to the authors, management should fill several roles, each adding to the continuance of earnings. Throughout the book some of the corporations mentioned are evaluated. A percentage of these, it is suggested, should be kept for years. "Buy and hold" is a maxim to be remembered.

Companies have been so lucidly analyzed that it seems almost an easy art. Moreover, excellent charts illuminate the text. To all investors this book is something to hail with gratification.

MADE IN DETROIT

Norman Beasley and George Stark
G. P. Putnam's Sons, 311 pp., \$5.00

The interest in Detroit as an outstanding manufacturing city intrigues most Americans and, of course, is of special importance to persons who have helped build the city.

The first automobile company formed in Detroit began manufacturing in 1899, and did not live long. Since then the Ford Company has come and flourished. Cadillacs emerged from a meager beginning in 1902, while the then highly regarded Winton car came and went.

It will be of significance for young analysts to learn, by means of an engaging story, that even industries with an undeniable future, as was that of the automobile early in the century, leave casualties of companies on the way. Correct timing seemingly cannot be overlooked.

Today's Detroit, with affluent production, is worthy of study.

COMPARATIVE ECONOMIC DEVELOPMENT

Ralph H. Blodgett &
Donald L. Kemmerer
McGraw-Hill Book Company, Inc.
557 pp., \$6.00

For the evaluation of comparative economic development in leading countries this book should serve a real purpose. In it the evolution of similarities and differences in certain countries give a foundation for an appraisal of possible trade. The authors have concentrated their investigations on four countries, namely, the United States, Great Britain, Russia, and Germany. This, which is more than a text book, recounts the historical growth and accomplishments of each of these nations. In the last chapter they are weighed and compared.

Summarizing each of the four systems, the authors find that in the United States, where the individuals are "still left relatively free in economic matters," decisions are made on the basis of prices and price relationships, products going to the highest bidder. There have been times of control to a lesser measure.

During George Washington's era 95% of the American population was rural. Today most of the nation's farm income comes from commercial farming in place of the former subsistence farming. Cash farm income rose from \$3.6 billion in 1940 to \$9.4 billion in 1952, and with it an increased use of farm machinery, thus building a vast mechanized equipment industry, and opening increased acreage for planting.

In Britain regulations on agriculture culminated in an important act in 1933 which established marketing boards. Britain has been "more successful than almost any other European nation in keeping her level of food production from falling much below war levels."

Accomplishments and criticisms of Russian collective farming and its use of farm machinery are portrayed with accompanying tables. The German overorganization of agricultural products is described.

Comparisons of transportation and communications, manufacturing, finance, labor, as well as the general economic well-being of each of these four countries, are given, each in detail, with supporting figures. An interesting comparison to be examined lies in differences in taxation methods. This is likewise true of investment possibilities and general well-being in the countries studied.

The historical background of enterprise in each country indicates a great amount of research from which the reader can benefit.

CORPORATE BONDS: QUALITY AND INVESTMENT PERFORMANCE

W. Braddock Hickman
National Bureau of Economic
Research, Inc.
33 pp., \$75

Findings based on a study of corporate bonds offered between 1900 and 1943 show that greater returns could have been obtained from low-grade corporate bonds than from higher quality issues. However, the practice of investments in low-grade issues is best for holders of large portfolios, where the default losses of some low-grade issues will not be drastic, since the number of issues held is large.

In Mr. Hickman's study of corporate bonds, real estate mortgage bonds and bonds of financial corporations are not included.

Several points concerning the aggregate behavior of defaults are that the life span loss was 3.7 per cent, although capital losses on defaulted issues were just offset by capital gains on irregular offerings and regular offerings called or selling in 1944 above amortized book value. Bonds offered before 1932 and extinguished between 1932 and 1943 were subject to heavy default risks during the depression.

Low-grade bonds of declining industries rarely worked out as well as high-grade issues.

As is usual in "Bureau" books, the charts and tables bear long study. It is from them that facts and factors become clear.

A NEW TRICK FOR RECOVERING "STUBBORN" CRUDE OIL

WATER-FLOODING operations in oil fields have helped recover millions of barrels of oil that otherwise might have remained in the ground forever. Water-flooding is the process of injecting water into the ground near a well that has lost normal production. The force of the water pushes crude oil to the surface through another nearby well thus increasing production from the pool.

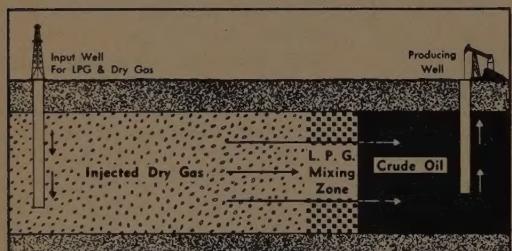


Diagram of Sun-ray's miscible phase LPG oil recovery plan in Bisti Field, New Mexico.

SUNRAY MID-CONTINENT has put into effect an improved type of secondary recovery project that is designed to produce crude oil that can't be recovered by water-flooding. LPG (Liquefied Petroleum Gas) is injected into the oil-bearing formation where it mixes with oil. The oil-LPG mixture is then pushed to the surface by an injection of natural gas.

THE THEORY BEHIND THIS RECOVERY METHOD is very simple. Suppose you have oil on your hands and attempt to wash it off with soap and water. The water will flush off some of the oil, but not all of it. But if you use gasoline the gasoline will mix with the oil and the oil-gasoline combination can easily be removed from your hands. That's the way the LPG works - it washes out the oil!

SUNRAY HOPES to increase oil recovery by an estimated 50 per cent in the operation of these leases as opposed to perhaps a 25 per cent recovery by primary operations. This is oil conservation in the best interests of the producer, the landowner, royalty owners, taxpayers and the nation.

D-X is the brand name of quality products manufactured by D-X Sunray Oil Company, a wholly-owned subsidiary

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BOSTON EDISON COMPANY

Preferred Dividend

A quarterly dividend of \$1.06 per share has been declared, payable on the first day of February 1958 to holders of record at the close of business on January 10, 1958 of the Company's Cumulative Preferred Stock, 4.25% Series.

Common Dividend No. 275

A quarterly dividend of 70 cents per share on the Common Stock of the Company has been declared, payable on the first day of February 1958 to stockholders of record at the close of business on January 10, 1958.

Checks will be mailed from Old Colony Trust Company, Boston.

ALBERT C. McMENIMEN
Treasurer

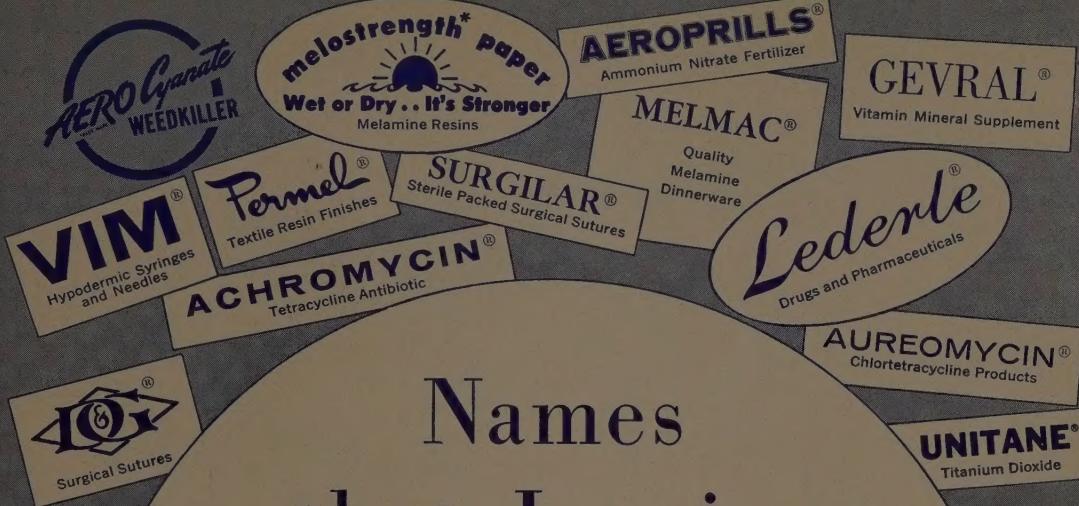
Boston, December 23, 1957

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SUNRAY MID-CONTINENT
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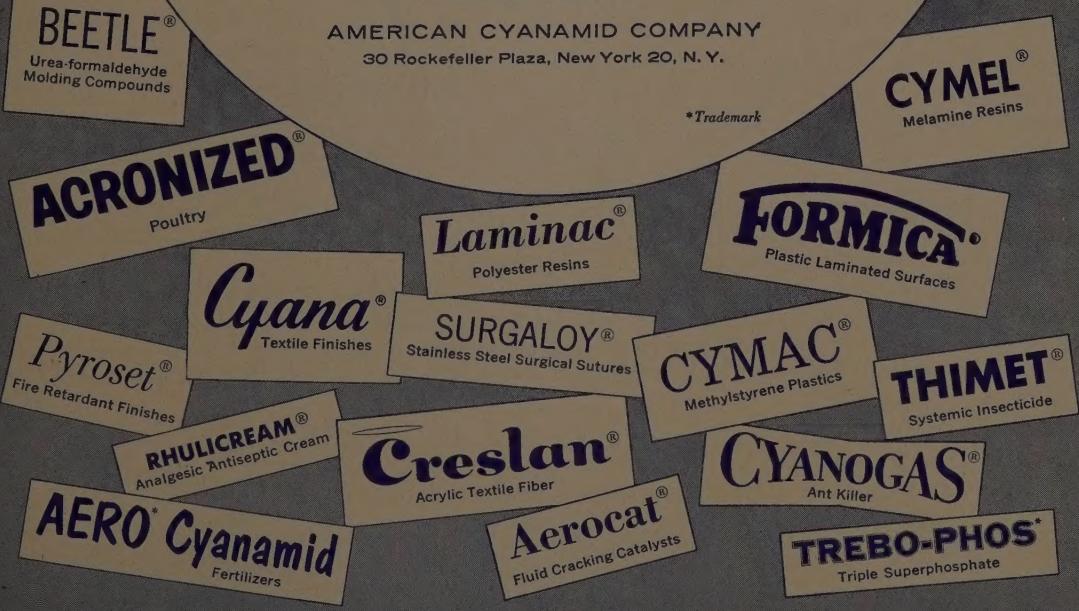
Names that Inspire Confidence

Shown here are a few of the product names and trademarks of American Cyanamid Company. In the various fields in which they are used—in business, industry, the professions, or the public—each represents a high standard of quality and integrity. All are backed by Cyanamid's extensive research, production, and service facilities.

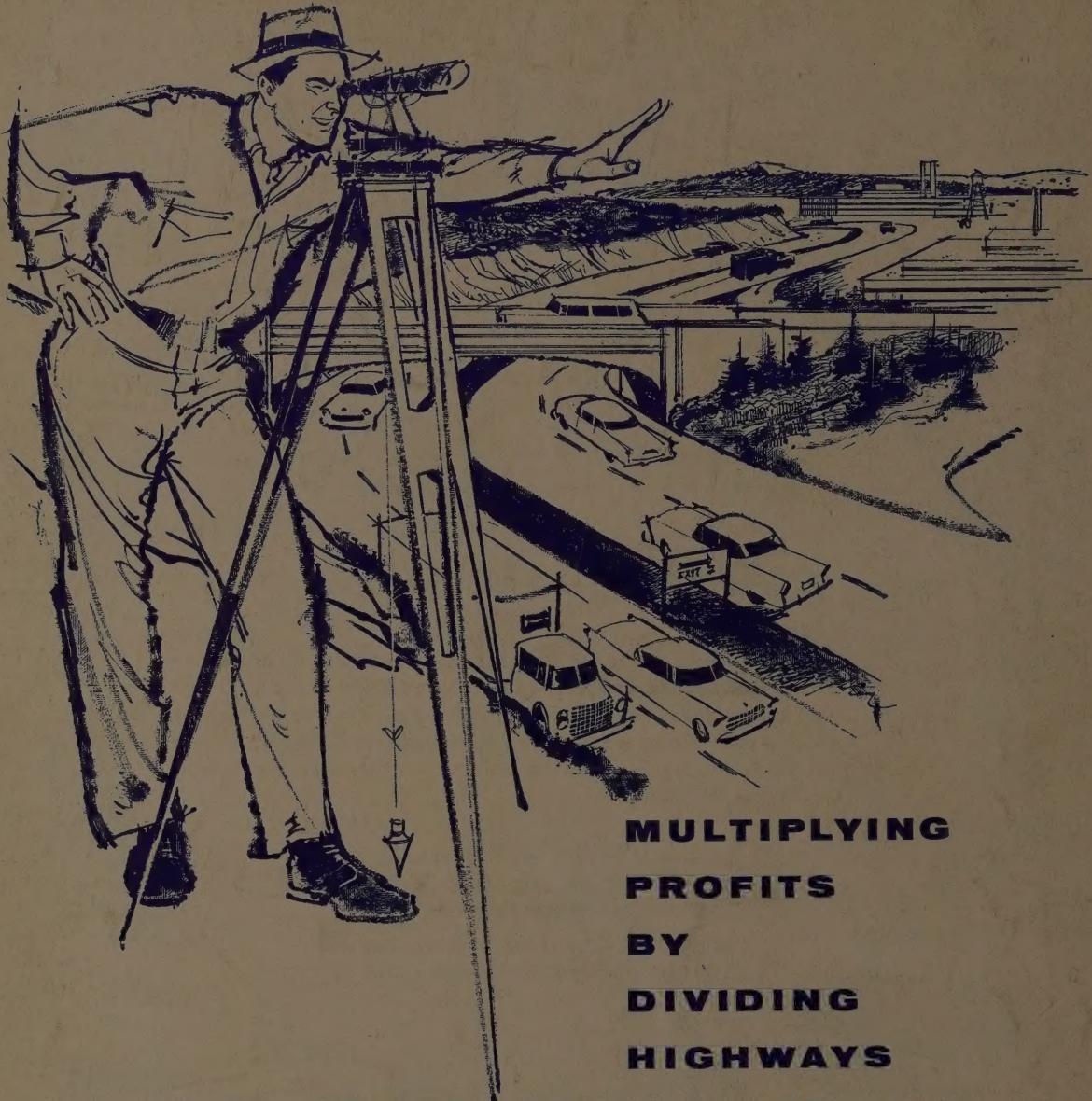
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*Trademark



Why all the activity in New England Electric?



**MULTIPLYING
PROFITS
BY
DIVIDING
HIGHWAYS**

Modern highways have been termed "the arteries of a region". If the comparison is good then New England's circulation is rapidly improving, thanks to a progressive highway building program.

Super-highways, criss-crossing the area, carry nourishing commerce to all points of the compass, plus new ease in travel to recreation spots that makes people want to live and work in New England. All of this is ushering in new profits and prosperity to the region where New England Electric supplies power to more than two and one half million people.

All this means good living and profit to New Englanders — and profit, too, for farsighted folks in other sections of the country who have investments in New England industry and business.



New England's Largest

NEW ENGLAND ELECTRIC SYSTEM